

A man and a woman are shown in an outdoor setting, likely a radio station. The man, wearing glasses and a dark jacket, stands behind the woman. The woman, also wearing glasses and a dark sleeveless top, is seated and speaking into a microphone. In front of them is a table with various electronic equipment, including a large black power supply unit with red and black cables, and a smaller black device. A clear plastic bottle of water is also on the table. The background shows a brick wall and some trees.

Amateur Radio



The magazine for AUSTRALIAN
radio amateurs

Volume 73 No 12
December 2005



\$6.50
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**Amanda
VK4FRST:**
*first
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Amateur Licence Reform – just in time?

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Editorial

Editor: Colwyn Low VK5UE
edarmag@chariot.net.au

Technical Editor: Peter Gibson VK3AZL

Publications Committee Members
Brenda Edmonds VK3KT
Ron Fisher VK3OM
Don Jackson VK3DBB
Evan Jarman VK3ANI
Tom Potter VK3UBS
Bill Roper VK3BR

Submission of material to Amateur Radio Magazine

General and Technical articles to
Secretary
AR Publications Committee
3 Tamar Court
Mentone VIC 3194
or armag@optusnet.com.au

Columns and Letters to the Editor to
Editor
AR Magazine
34 Hawker Crescent
Elizabeth East SA 5112
or
edarmag@chariot.net.au
(Tel and Fax 08 8255 2138)

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PO Box 431
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Fax 03 9756 7031
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Registered Office
10/229 Balaclava Road,
Caulfield North VIC 3161
Australia
Phone: 03 9528 5962
Fax: 03 9523 8191

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Our Cover this month

Congratulations to Amanda Gray VK4FRST, the first Foundation Licence holder. The cover photo shows her operating on 2 m. For more details see ALARA column on page 35.

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues

Back issues are available directly from the WIA National

Office (until stocks are exhausted), at \$4.00 each (including postage within Australia) to members.

Photostat copies

When back issues are no longer available, photocopies of articles are available to members at \$2.50 each (plus an additional \$2 for each additional issue in which the article appears).

Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

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Registered Office of the WIA

10/229 Balaclava Road, Caulfield North VIC 3161

Tel: (03) 9528 5962 Fax: (03) 9523 8191

email: nationaloffice@wia.org.au

<http://www.wia.org.au>

All mail to

PO Box 2175 Caulfield Junction VIC 3161

Business hours: 10am – 4pm weekdays

National Office staff

Judith Oliver	Office Coordinator
Emma Trebilco	Examinations Officer
Brenda Edmonds	Office Volunteer

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QSL Curator

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Webpage co-ordinator	Colin Thompson	VK2TRC
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Gilbert Hughes	VK1GH
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Editorial comment

Colwyn Low VK5UE

The sixth Christmas

Christmas is with us once again. The state of the world does not seem to have changed much for the better since last Christmas. We have continuing wars and natural calamities. We certainly need the message of hope that Christmas brings. I wish all members a Happy Christmas and a prosperous New Year.

I suddenly realised that this issue completes my sixth year as Editor of AR, a job I took on for a year while a long term editor was found! It has been an interesting experience and I thank all those who have supported me through the years, the Publications Committee, the various Presidents and the contributors. If it were not for the contributors there would be no magazine and if it were not for the columnists there would be no news. The columnists are a bit like the Editor; every month they have a job to do even if they are on holiday. I have sat at a terminal in Durham, England, correcting the next issue of AR. That did not endear me with my XYL!

Don Jackson VK3DBB has decided to retire from the Publications Committee. I enjoyed working with Don and need to place on record my and the WIA's appreciation of Don's contribution to AR and the WIA. Don was Secretary of the Pub Com, produced the statistics on the composition of AR and helped vet the HamAds. His quiet competent support of the Pub Com and the Editor was much appreciated. Thanks Don 73. Ernie Walls, VK3FM/CEW has agreed to join the committee.

It is good to see that the Foundation licence is rapidly producing new amateurs and also many young amateurs. The WIA News column shows that this

is a world wide phenomenon and IRLP provides a simple way of contacting DX without having to set up large beams, long wires and/or tall poles.

This is the time of year when we may decide we should do things differently. More time on amateur radio, less time on amateur radio. Fix the antenna system, add to it or change it. Work more contests, spend less time on contests. Get out on a field day, give up field days. Make a real effort to get a DXCC award. You might even think about sharing something you have found useful and/or interesting with other amateurs through AR magazine.

The arrival of the new Foundation licensees has placed a challenge to all existing amateurs and to AR magazine. What we need to do is publish a series of articles aimed at this group providing simple advice, describing simple equipment for the new shack and also providing simple theory on aspects of equipment function or possibly propagation variations with frequency, time of day, time of year and meteorological conditions. As I said last month we only survive on members' input and if AR dies from lack of input there is no-where else to go relevant to the Australian amateur scene. To put it simply AR needs articles relevant to all licence classes and to beginners. How else are they to learn or even learn what is the correct question to ask?

So on behalf of all those who produce *Amateur Radio* magazine I hope you have a great time over Christmas and the New Year and that 2006 brings you great satisfaction with what you do, what you build and what you give to others.

73 Colwyn

*The President, Directors and office staff of the
Wireless Institute of Australia*

wish all members and readers of Amateur Radio

a very happy holiday season and a prosperous 2006

We will be back to serve you again in February

More on the Foundation Licence

In last month's *Amateur Radio* I reported on the coming into effect of the new amateur licence structure, the first Foundation Licence Training Course conducted by the Gold Coast Amateur Radio Society over the weekend before the amending Determination came into effect, and the issue of the first Foundation licences only days later.

As the piece was called, "that was the week that was"! Now that week is four weeks behind us, I would like to follow up on what has happened since then.

In those four weeks I have met with clubs in Tasmania and the representatives of New South Wales Clubs in Sydney. My overwhelming impression is that many amateurs see the qualification of new amateurs as the immediate challenge to their current resource. Some of us have turned coordinating our assessment responsibilities into an almost full time occupation.

Your Entry into Amateur Radio – The Foundation Licence Manual is published, to a very favourable reception.

The flood of inquiries about the Foundation Licence has eased. It almost stopped the office. We put the answering machine on so that others outside the office could answer the queries.

What have we learned?

It is clear that there is a great demand for the new entry-level licence, even without publicising it except in a couple of isolated cases. Where promoted, the response has been even greater.

The practical assessment's emphasis on operating procedures is important in producing new amateurs with an understanding of amateur procedures, rather than some made up procedure or some modified CB procedure. With hindsight, that aspect of the syllabus is more important than I first thought.

Assessors are, in many cases, extending the practical assessment in smaller groups over ensuing evenings to ensure the proper levels of instruction, coaching and assessment are achieved. This has also assisted candidates to gain higher levels of on-air confidence.

We have also learned that there is

a limit to the number of Foundation Assessment Packs that we can produce, though it would seem that we would be able to meet current demand until the end of January. We are not processing the results as quickly as we would like, and if too many come in at once, ACMA will be unable to process more than a certain number a week. In the short run, please expect and accept delays.

Delays may happen because it would be irresponsible to apply our whole resource to the single project.

We are still implementing our new membership management software and our interlocking accounting systems. Like all such introductions, glitches can happen. We sent out reminder notices to many people who had paid by direct debit. Hopefully, after many apologies, that won't happen again.

We are still introducing a better bookshop.

We are still filling orders from clubs and individuals for the new Callbook, at the same time as we are filling orders from clubs and individuals for *Your Entry into Amateur Radio*. We have orders for over 2,200 of those books from single copies to cartons. The WIA is filling these with the help of absolutely invaluable volunteers. (We need more, if you live in Melbourne and can help, please contact us.)

The introduction of a Foundation Licence as the new entry to amateur radio in Australia is one of the most important changes to the structure of the amateur service in very many years. We just have to respond to this opportunity. It cannot be the total focus of everything we do, but it must have a real priority. Getting the balance right is the trick.

Will the Foundation Licence really attract new amateurs? Will they retain their interest? Will they aspire to and achieve higher levels of qualification?

Only time will answer those questions, but the UK experience is encouraging.

Our new assessment procedures are a vital part of making amateur radio attractive to a new generation.

Our new procedures mean that for the first time a candidate for an amateur

qualification assessed by a WIA Assessor is dealing with someone actually qualified to do that task.

Our new procedures mean that a candidate assessed by a WIA Assessor learns the result immediately, and will be given guidance as to where more work is needed, if that is appropriate.

Our new procedures mean that for the first time there is quality control, with the annual audit of each WIA assessor, and with accreditation renewable each three years. This level of quality control ensures that the standards set are the same across the country. Varying standards are a real risk with the value judgements of the practical assessment.

This does not mean we do not need the existing invigilators and group leaders. We will not, for a long time, have enough qualified assessors. There is a real need for the present groups to continue to work together.

It is my hope that what the WIA has invested in creating a new qualification system, and what so many people have invested their time and their energy in, will stand us in good stead when ACMA seek to review the future responsibility for amateur examination management, as contemplated in the "Outcomes" paper published in May 2004.

In short, amateur radio and the WIA are going through a period of real change, and I believe, change for the good, ensuring the future of the amateur service.

Our success at coping with this change depends on a number of factors. One is the essentiality of the clubs and the WIA working together to meet the demand. Another is that we must realise that we cannot put pressure on WIA Assessors to do more than they reasonably can do in a day for, if we do, we will encourage mistakes. Another is to realise that our resources are finite, both administratively and with the number of available Assessors at any one time.

And finally, our success depends on goodwill, understanding and patience.

And with all of that, I have faith in our future.

WIA adopts election regs and appoints Returning Officer

Clause 14.1 (c) of the WIA Constitution says, in part, that "The Board may determine that the election of Directors be conducted by postal ballot with the result of the election to be announced at the annual general meeting. A postal ballot shall be conducted in accordance with the regulations made by the Board from time to time."

The WIA Board has decided that election of directors will be by postal ballot and has adopted regulations to govern the postal ballot. These have been placed on the WIA website.

The Board has appointed David Wardlaw, VK3ADW, as Returning Officer to conduct the postal ballot required before the next Annual General Meeting. A notice calling for nominations for election as a WIA Director is in this AR.

A Bookshop Update

The WIA bookshop thrives and is stocking ARRL's QST magazine. If you are interested, get in quickly. The November QST is available now.

VK3PC appointed chairman of IARU Region 3 Disaster Communications Committee

At the 2005 IARU Region 3 Directors meeting held in Bangalore on October 5 - 7, 2005, the Directors appointed Jim Linton, VK3PC, as the temporary Chairman of the IARU Region 3 Disaster Communications Committee. Jim's term is until the 13th IARU Region 3 Conference at Bangalore, India, in 2006.

Freeze on new 2-letter callsigns

Under the new amateur licensing arrangements, callsign groups allocated to the Advanced licence include all groups previously allocated to the Unrestricted, Intermediate and Limited licences. A person with a Z call may now apply for a callsign previously only available to a full call.

Two letter suffix callsigns are in short supply particularly VK2, 3 and 4.

These callsigns are not being issued until ACMA can develop an equitable arrangement for their allocation. This is expected shortly.

President meets VK7 clubs

On 9 November WIA President, Michael Owen, VK3KI met members of the

Northern Tasmanian Amateur Radio Club at a meeting/BBQ at the home of secretary David Potter, near Launceston.

Next evening Michael met members of the Radio and Electronics Assoc of Southern Tasmania at its clubrooms in the former OTC Marine Wireless Station in Queen's Domain in Hobart.

Both meetings were well attended, and Michael reported on what was happening in the WIA, but most attention was paid to the new assessment system and the need for Foundation licence courses, and the need for more WIA Assessors.

ACMA adds info page on licence changes on website.

ACMA have added a "frequently asked questions" and information page covering the recent changes made to the amateur service. This page is at: http://www.acma.gov.au/ACMAINTER.65690:STANDARD:551322618:pc=PC_1256

Silicon Chip slams BPL

Electronics magazine *Silicon Chip* says broadband over powerlines (BPL) is a flawed technology flying in the face of EMC regulations. The November cover story "BPL is coming" looks at the spectrum-polluting broadband enabling technology delivered along power lines.

The article said that BPL promises delivery of fast broadband with little new infrastructure. BPL has been a pipedream for years. But the wires to carry the broadband signals are stretched in the air and make "magnificent antennas radiating interference" across the spectrum.

15 new Tassie Foundation Licensees

On 22 November the Radio Electronics Group of Southern Tasmania ran Foundation Licence Training and Assessment at their Hobart Clubrooms.

Fifteen participants attended training, including a 15 year old, a number in their 20s and an amateur's XYL. Some had attempted the former Novice exams and others had used CB for many years but never stepped up to amateur radio. Four had assisted with WICEN operations on car trials so had some valuable operating experience.

Although the only trainer and WIA assessor was Reg VK7KK, the group received much operating practice and training from some helping amateurs

both at the clubrooms and over the air.

Ten candidates were assessed on Sunday; the other 5 will be assessed the following weekend. It is hoped that by the end of the following weekend there will be 15 newly qualified VK7s.

Activity increase for young people in amateur radio

Around 30% of the people who are studying for the new Australian Foundation licence are 18 or under and it seems that worldwide the number of young people attracted to the hobby is growing. The following two items support that contention.

John Schurman, AA7UJ reports that IRLP Node 3978 in Seattle, WA is the primary repeater for a group of kids from Benjamin Franklin Elementary School. A teacher, Dave Condon KI7YP, has brought more than 400 new hams on the air with his program for ham radio. They also have worked with ICOM to produce a couple of ham radio comic books.

Peter Treadwell, G7PCT is a UK schoolteacher teaching ham radio to two classes of 20 plus 14 year olds. He is interested in finding similar groups and would like to make on air contact with them. He is on IRLP node 5350. Time Zones might be a problem as his classes in radio are on Fridays at 9.45 to 10.35 and 14.35 to 15.25 UTC.

WIA, AR NSW and Clubs Meet

On Saturday, November 19, 2005 the joint conference of New South Wales and ACT clubs was held at Amateur Radio House, Wigram Street, Parramatta.

Over 20 people participated in the meeting.

Following opening addresses by ARNSW President Chris Devery, VK2XCD, and WIA President Michael Owen, VK3KI, topics discussed included the Foundation Licence, BPL, State and National Broadcast contents and format, dealing with deceased estates and the essentiality of a true WIA/club partnership.

John Gibling, VK2EKG, provided a presentation on working with young people.

It was agreed by all clubs present that the WIA/club partnership is working well for the benefit of amateur radio.

ar

What a sight! an antenna with a difference

Mark Aitken VK3JMA

Not being an HF buff, but requiring a minimal but effective all-band antenna that would suit *She Who Must Be Obeyed* (SHMBO), I started to surf looking for some type of antenna that would suit these requirements.

I usually used my 80 m dipole and an antenna tuner to give me most HF bands with a degree of good operation, but as Murphy would have it, there was always some thing that did not perform adequately even for an "novice" HFer.

Then, by chance, my brain remembered that I had been given a complete but damaged TH3jr a few years ago and together my brain and I set about rigging up the driven element to my ridge pole in a simple 10/15/20 m trapped dipole. I fed it with the balun that came with the TH3JR and was happy to see relatively good VSWR figures without the antenna tuner. The tuner was used just to take up the slack and give me that 1:1 (or as close as possible) VSWR.

Why not just fix up the TH3jr and

use that. Remember SHMBO? Even I didn't want the thing hovering above the roof.

Then I was very lucky to be given a Nally Tower from a friend and this then altered the requirements of antennas around the place and gave me the opportunity to clean up a bit more.

It was decided that I would have only the following antennas around the place....

Firstly, 6 m/2 m/70 cm and 23 cm verticals attached to "hockey stick" poles on the second story eaves, nice and neat, un-obtrusive and easy to install.

Next, HF antenna mounted on the tower, along with 6 m/2 m/70 cm and 23 cm horizontal beams for weak signal modes (not yet installed).

Finally, remove all antennas from the second storey ridge pole apart from the 2.4 GHz wireless LAN dishes.

That was discussed with SHMBO and, although grumbling did occur, it was settled.

Now back to the "antenna with a difference".

The tower had changed my HF situation somewhat. How it was to be positioned on my block would have my 80 m dipole bent in all sorts of directions and would probably end up being less efficient than it already was? I started to think about the old Chirside 5-band trapped vertical that I had lying around in the back yard but remembered all

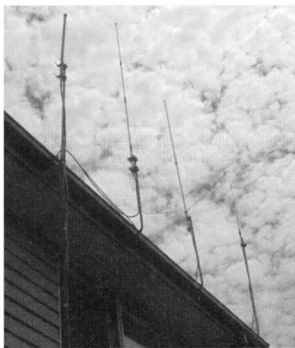


Photo 1 – 6 m/2 m/70 cm and 23 cm verticals attached to "hockey stick" poles on the second story eaves, nice and neat, un-obtrusive and easy to install.

sorts of horrible things about using it on all but 29 MHz FM years back so I really did not feel like re-visiting that scenario.

However, the thought of a 5-band horizontal dipole did have attraction, but not your usual wire and trap one or a multi-band one like a G5RV; same problem with the 80 m dipole, bent here, twist there, messy!

I thought why not just have two HF verticals mounted end-to-end and feed like a normal dipole? Yes, I thought it would work. I then set out in search of a second Chirside 5-band HF vertical exactly like the one I already had. www.vkham.com classifieds worked like a treat and I promptly asked for, received a reply, and bought a second unit from VK6.

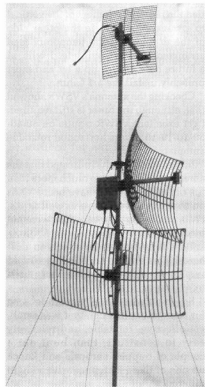


Photo 2 – The 2.4 GHz wireless LAN dishes.

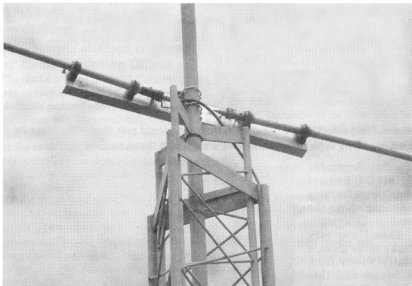


Photo 3 - A simple piece of C section aluminium about 750 mm long as used as the basis for mounting both verticals in their horizontal position along with suitable U-clamps for mounting to the tower pole.

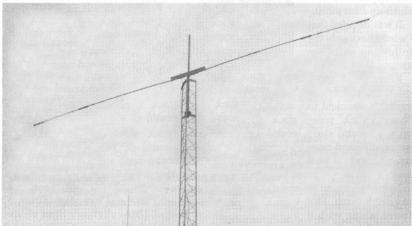


Photo 4 - The two vertical antennas mounted as a horizontal dipole on the tower.

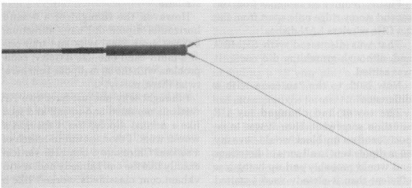


Photo 5 - The far end of one of the Chirnside vertical antennas mounted horizontally.

A simple piece of C section aluminium about 750 mm long was used as the basis for mounting both verticals in their horizontal position along with suitable U-clamps for mounting to the tower pole.

Drill, drill, screw, screw, tighten, tighten and it was done on the ground. The nature of my backyard and the size of the antenna, about 11 m long now, did not enable me to tilt the tower over for ground level mounting. I donned the pole climbing safety belt, an absolute must for any ham that works on top of their tower for whatever reason, and worked in mounting the antenna from atop the tower.

No mean feat but none the less completed in about an hour.

Feeding it was the next task. I would have liked to make up a 1:1 balun but didn't want to wait - impatient! So I simply fed one side of the trapped dipole arrangement as if it was a normal vertical, ie, directly into the SO239 of the antenna. This took care of one side and the earthing/ground side was also taken care of as I have tied both the ground sides of each vertical together and grounded this to the main mounting bracket. Then a shorted PL-239 plug was screwed into the other socket and that tied the radiating element of the vertical to ground potential, ie the other side of the dipole, and the temporary feed arrangement was complete. I will, at a future date, tidy it up a bit and most probably install the 1:1 balun.

Checking the antenna's VSWR showed that, although the tuner is still required, I got excellent VSWR results on 80-40-30-20-15-10 in one horizontal rotatable antenna.

Initial on air results indicated that the antenna is "hearing" so much more than the old 80 m dipole. I have heard VK6s on 20 m like never before, as well as JAs, FM6, and Gs on 40 where they were not heard before.

This may not seem much to die-hard HFers but for me this is a 10 fold improvement on what I have been used to.

So, in conclusion, if you are looking for something, like me, that was small, yet effective, rotatable, and relatively easy to construct, then hunt out a couple of trapped verticals and knock up one of these 'antennas with a slight difference'.

DATV down under

(part 2)

Richard L Carden VK4XRL

This article was originally published in CQTV 204, November 2003

With reference to my earlier article, further tests have been carried out on 13 cm. A new power amplifier for 23 cm, and finally a digital receiver, have been placed in the repeater VK4RKC to further educate and provide information on propagation due to changing weather conditions.

Repeater operation

The repeater VK4RKC is situated some 54 km north west of my QTH and overlooks most of Brisbane and the Sunshine Coast. It's an ideal site as we don't need to rotate the receiver antenna and the transmitter antenna is a sixteen-element phased array.

One of the problems that faced us during the planning stages was how to recognise the digital signal. This is due to the receiver giving out the dreaded blue screen effect. After trying a number of receivers, a digital receiver type ELSat-ZDX 9111E appeared across the desk. This receiver had a red LED that switched on when a digital signal was being received. Also, it was a no frills receiver that suited installation in a repeater. Another nice feature was that the received testpic produced by the DATV transmitter remained locked most of the time.

An interface board was duly built which switched a relay from the LED circuit, enabling the relay contacts to be utilised for any requirement that may arise. In order to keep the analogue operation in parallel with the digital operation, a separate interfaced stereo audio and video switcher was also built. It was designed using relays and its rest position was across the analogue signal. This now allows us to see the difference between the received analogue and digital signals even though we are transmitting back on 426.25 MHz AM. This situation may not be for long as the bottom part of the 70 cm band, 420 - 430 MHz, may be removed for other services.

13 cm operation

The required software changes were made and downloaded to the DATV unit.

The frequency was set to 2415 MHz, all other parameters being left at 6000 SBR, 3/4 FEC and 5500 video bit rate. The output from the DATV unit produced a carrier at an output level of 0 dBm and the shoulders were at -42 dBc.

The power amplifier used was a local unit from Mini-kits in South Australia. It is a nominal two watt unit, running class 'A' and the part number is EME91B.

This unit worked very well with the FM modules producing the full two watt output. Once connected, the system produced an output of +26 dBm with shoulders at -30 dBc.

23 cm operation - new power amplifier

One of the main problems has been to raise the power level up to at least half the analogue power level. In my situation I use around 2w on FM to operate the repeater; we know that +25 dBm can access the repeater also. However, due to weather conditions this could be subject to the cliff effect. What I wanted was at least one watt. Therefore an amplifier was constructed using dual power modules type M67715. Two 3 db couplers were made using hard line, with the centre removed and replaced with a twisted pair of enamel covered wires, each wire representing 100 ohms impedance. With two 100 ohm lines in parallel the required impedance of 50 ohms is achieved. I made up an Excel program to calculate the required lengths for the 3db couplers.

This amplifier, via an external 3db pad, produced an output of +30 dBm maximum with shoulders sitting at -30 dBc. The second harmonic was at -40 dBc and noted spurs at 340 to 710 MHz were at -50 dBc. When first used with the repeater, the transmitted signal

interfered with the received signal from the repeater - the FM transmitter was clean in this regard. The output from the DATV transmitter was then checked more thoroughly this time. The second harmonic was at -30 dBc and noted spurs at -46 dBc. An inter-digital filter, which I had on hand, was then inserted between the DATV output and the amplifier input. Now the output signal was clean with spurs >-70 dBc and the second harmonic was now at -50 dBc.

The next step was to add an extra encoder board to the system. This was purchased and the video bit-rate set to 2300 k. Little information could be found on the web regarding the requirements in setting up the system for two encoders. One cannot arbitrarily set the SR and hope it works. To this end an Excel spreadsheet can be found on the S5-DATV- ATV Slovenian ATV site which works out the SR for different overall bit-rates at 3/4 FEC.

Armed with this information, a small Excel program was made to determine the allowed bit-rates for both encoders, taking into account the two audio streams at 192 k, the teletext at 300 k and the testpic was set at 300 k (couldn't find any real figures for this one).

The Excel program was a useful aid in setting the bit-rate parameters. We opted for an SR of 7500 which gives a signal bandwidth of 10 MHz.

Conclusions

The system works very well and a second digital receiver will be placed at the repeater site in due course. Also, we have now access to a 2.4 GHz transmitter that can take either analogue or digital. Unfortunately, the IF is around 36 MHz and was used for MDS. Since a lot of receiving equipment has come onto

the market we may at this stage opt for VSB.

It may be possible at a later stage to try dual 2 W amplifiers at 13 cm as per the 23 cm unit. Also, note that the M67715 is becoming obsolete and is being replaced with a MOSFET unit type RA18H1213G. It is hoped we can try these out as soon as we can lay our hands on them.

Another development that is worthy of a second look is the Dutch DATV system and I would like to thank Henk for his continued feedback on its development. I would also like to thank Mark VK5EME of Minikits for his support.

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www.minikits.com.au
www.d-atv.com
http://lea.hamradiosi/~s51kq/S5-DATV.HTM

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DATV update

Since writing the two articles 'DATV down under', the reference to the Mini-kits 2 W power unit has been superseded and replaced with Kit Part Number E128 KITB. This kit now uses a PHEMT MMIC IC, which has a gain of 29 dB, and a saturated output power of +33 dBm at -1 dB compression point.

I have now purchased one of these for evaluation, and it would appear possible to run this at 6 dB lower than the +32 dBm output (ie +26 dBm) for shoulders around -30 dBc. Two of these units could then be used for near +30 dBm output.

The RA18H1213G power amplifier is now available from Mini-Kits. The suggested ratings for this unit are 18 W output for 200 mW I/P on FM ATV or 14 W PEP linear output on SSF. I have now purchased one of these for evaluation on DATV. The norm has been to run these at -6 dB lower

than the stated output for DATV. This would mean an output of +35 dBm or 3 W approx. Tests have indicated this to be correct with shoulders around -35 dBm. If more power is required then again two of these units could be coupled together via 3 dB couplers producing a power output of around +38 dBm (ie 6 W).

The Dutch System mentioned in those articles has now had a pre-production run and it shouldn't be long before these are available. The web site www.d-atv.com has also been updated with many photos and articles relating to DATV and especially to their own system. This is in English and is worth reading. Also take a look at Mini-Kits Web site at www.minikits.com.au for further information on the above power amplifiers including price and availability.

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Synchronised antennas

Dave Giles VK5DGG

During the last full weekend in June the ARRL holds its annual field day contest. This year the controllers for the AMSAT OSCAR-51 (AO-51) satellite placed it in mode V/S from 17 to 26 June so everyone could get plenty of practice before the contest. Mode V/S involves transmitting on 2401.200 MHz FM. The transmitter on AO-51 transmits continuously with ~2.5 watts output. In theory, very small receiving antennas are usable.

Equipment for S-band (2.4 GHz or 13 cm)

A PCB Yagi and PCB dual patch antenna were purchased from Alan VK3XPD at the SERG convention. The PCB Yagi has five elements, gain of 8 dBi and measures just 70 x 65 mm. The dual patch is not much bigger with similar gain. The PCBs were supplied bare so Teflon coax with SMA plugs were soldered to the antenna elements.

I have been using the Pacific Monolithic MMDS down-converters (that were used locally for the failed MMDS TV system)

since 2001 with amateur satellites UO-11, AO-40 and AO-51.

For receiving 2401.200 MHz the down-converter's output is around 450.200 MHz. The design tuning range is 2300 to 2400 MHz for an output of 349 to 449 MHz. This puts AO-51 at the extreme edge of the down-converter's filtering, but reduces local interference problems with cordless phones. It comes as a sealed unit with its own internal dipole and reflector etched onto the down-converter PCB.

I have modified two of them by slicing the antenna section off the PCB and soldering an SMA connector in their place. The result is mechanically flimsy and unoptimised, but ideal for experimenting with antennas and strong signal sources.

The satellite and operating it

AO-51 is a 24 cm cube with a ¼ wave whip for 145.9 MHz on one side and a sleeve monopole (similar to a ¼ wave ground-plane) for 2.4 GHz on the opposite side. This means that the

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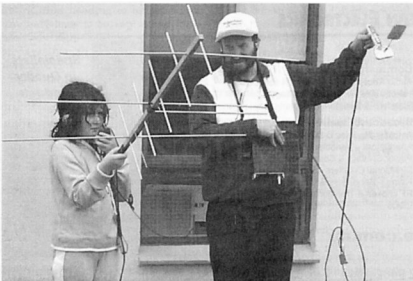


Photo: Dave Giles VK5DGG and daughter Naomi work AO-51.

antennas are linear polarised but in line with each other so the polarisation of both will be the same. AO-51's 70 cm antenna is circularly polarised.

Since the satellite may be pointing in any direction at any time as it tumbles through space, the ground station using linear polarised antennas (such as Yagis) must adjust for polarisation changes as well as point at the satellite or suffer deep signal fades. Even with circular polarised antennas, there is some fading when the satellite points its antennas away from the Earth.

The experiment with the PCB Yagi

Sunday morning (19 June 2005) and it was time to try the PCB Yagi and latest modified down-converter. Naomi was keen to have another go at a QSO through the satellite and I needed an extra pair of hands. The photo was taken just after the satellite pass. Naomi is armed with the FT-60, speaker-mike and homebrew "arrow" antenna for the uplink. I have the PCB Yagi, down-converter and FT-817 for the downlink. The radios are running off internal batteries. The down-converter is supplied by a 12 V GelCel on the ground through the bias tee (fitting near my left knee). This is a fully portable setup shown here in my backyard.

As well as operating the transmitter, Naomi had the extra job of watching

where and at what angle I was holding the PCB Yagi so she could synchronise the 2 m half of the homebrew "arrow" antenna. With her headphones on she could hear how good a job we were doing.

Operation is easy for the uplink. With a Doppler shift of ± 3 kHz there was no need to adjust frequency. However, during a pass the downlink frequency moves from +40 kHz to -40 kHz due to Doppler shift. Add to this the poor frequency stability of the down-converter due to thermal and hand capacitive effects (up to ± 30 kHz), and the small capture area of the antenna, and it proved to be a bit of a challenge to tune in to the bird.

Moment of truth

The result? Two QSOs with Jack VK2TRF and Rob VK3KOS. With an S6 noise level from the down-converter, signals peaked around S9. The PCB Yagi works. Both of us found it a challenge and were happy with the result. For comparison, the normal antenna used at VK5DG is a small BBQ grill and unmodified converter which gives signal peaks of S9+20.

In total, 11 contacts were made during the 10 day period.

Later, the PCB Yagi and down-converter were mounted on a 2 m Moxon rectangle (similar to a two element Yagi). Operation could now be made with only two hands - antennas in one, the other

for the microphone. The 2 m Moxon connected to the front socket of the FT-817, and the down-converter connected to the rear socket. Both VFOs were used in split mode, the receive VFO being adjusted with the mic up/down buttons. I could communicate through AO-51 but could not hear my own downlink (this simplex style operation is possible on the FM birds but not recommended).

Tests with the dual patch have not been so positive. On four passes the satellite was not heard once. Specifications given are for a frequency range of 2.4 to 2.45 GHz. My example may be tuned to the higher end of the range. Patch antennas have a narrow bandwidth.

Summary

With 2.5 watts of power, the 2.4 GHz transmitter allows very small antennas to be used by the ground station. The receivers on AO-51 are very sensitive, and QRP transmitters and low gain antennas are also usable for the uplink.

Mode V/S has been a semi-regular operating mode for AO-51 with an average of four days each month this year and has proved popular.

Another satellite was scheduled for launch in August 2005 that will use the same transmitter and a 70 cm receiver. With a 70 cm uplink, a future portable ground station could be very small indeed.

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Are you ready for action?

Part two

Bill Isdale VK4TWI

The key is the vital element so it needs to be distributed securely to all the radios. If the same key is used to encrypt a large volume of material it can be deduced by mathematical analysis of the encrypted output, so it must be changed from time to time. The key itself could also be compromised by some carelessness or a deliberate leak. It will be remembered that heroic efforts were made in World War Two to capture the encryption keys from U-Boats. The keys were written in water soluble ink on paper that would disintegrate if wet, so valuable was this secret. The keys were also changed daily. The Enigma system, carefully designed and administered, was, we now know, breached and provided intelligence of enormous value.

The Enigma system allowed for about 159 trillion possible daily keys. That is 159 followed by 12 zeroes. This was thought by its designers to be a safe system. A 128 bit key has 2 to the power of 128 possible keys, that is 340,282,366,920,938,463,463,374,607,431,768,211,456, so the user of such a system may feel pretty good about it. The mind-numbing number may indeed numb the mind.

But if it fails to numb, we might consider that the expression "128 bit key" describes the maximum amount of work needed to try every possible key; it says nothing about the minimum. A person trying to crack this puzzle and using a modern computer may get lucky and find a key which decrypts the data quite early on. On the average, though, it will be necessary to try half of the possible keys to find the correct one. That puts 128 bit keys into some perspective, but even so, it is a mighty task and taking into account that the information needing to be protected may only have to be kept secret for a relatively short time, say a few hours or days in many cases, the system should serve adequately. This is always provided the key is protected. Each radio channel could have its own key, further improving security.

The physical task of loading keys into each radio will be a burdensome one so it might be that a corner will be cut here and a change of keys simply sent out from a central transmitter to reprogram the radios on the circuit; a software upgrade. This would be very convenient but would compromise security as someone listening in at the right time with the right equipment will capture the key and be into the system. The cost saving and convenience of this form of key distribution would reduce security to effectively that of an

unencrypted system so it is to be hoped that such a superficially attractive choice is not made.

Before we leave this aspect, the creation of the key is a critical step and worth some thought. In most encryption programs that are around today, the key is generated by the software. It cannot, by definition, generate a truly random string of numbers as the software is running on a machine, a computer, and to quote a famous mathematician and pioneer of electronic computers, anyone who thinks a machine can generate a random number is in a state of sin.

The quality of being random can be thought of as uncertainty or disorder; it is a measure of entropy. More disorder is more entropy.

The key length illustrations that I have used are valid indicators of the work required to find the correct key if and only if the key is generated so as to achieve maximum entropy.

It is common that software which is used to encrypt digital data, such as that stored in computers, and using the supposedly secure 128 bit key length, generates the key from a password chosen by the person who types it in from a keyboard. That person may choose a 10 character

password that is, cleverly, not a word but a mish-mash of letters like LFEINVXLJA. The software uses this to generate a 128 bit key but the real randomness in this is of the order of 4 bits of entropy per character. The key is 128 bits long but is only as difficult to discover as if it was a 40 bit key. Bear in mind that each 1 bit of key length, in a truly random key, doubles the potential number of keys

such that a 101 bit key represents twice as many possibilities as a 100 bit key. A 40 bit key has 2 to the power of 40 possible keys, that is 1,099,511,627,776. This is not good. A computer trying a billion keys a second would, on average, discover the correct key in 18 minutes. In 1998, ages ago in the development of computers, a machine was built for the Electronic Frontier Foundation at a cost of about US \$ 200,000 and it won a prize by finding a 56 bit key used in DES, the US Government's Data Encryption Standard, in an average of 4.5 days. It tried up to 92 billion keys per second. The Banks stopped using 56 bit keys for their inter-bank transfers after that. Computing has delivered about double the "bang" for your buck every 18 months since 1998 so the equivalent computer today ought to cost less than A\$ 20,000 and at the speed achieved in 1998 find a key with 40 bits of entropy in an average of 12 seconds.

The machine that was built, the DES Cracker, sometimes called "Deep Crack" (no doubt after "Deep Thought" the most powerful computer in the Galaxy in the book by Douglas Adams which became a BBC television series "The Hitchhiker's Guide to the Galaxy") was built especially for the

task but with the technology that was available in 1998 to a non-government body; essentially to anyone with money. The same task today will be much more easily, quickly and cheaply achieved than it was then. My estimates are just that but ought to be good enough for present purposes; to show that the encryption key, to make full use of the algorithm, will need to be generated from

We can easily and quickly offer the civil authorities reliable and highly secure communications at nominal cost. These are desirable qualities in a system that we can easily make available but hopefully will only have to use for training.

a long pass-phrase. A cracking program, which will try the most likely things first, would eliminate the need to try every possible key sequentially, further speeding the process. The DES cracker uses that intelligent software plus purpose-designed hardware approach.

A pass-phrase in English may have only about 1.3 bits of entropy per character, making a 98 character phrase necessary to produce a 128 bit key with the full potential strength.

Assuming the hypothetical system is properly used, it will be capable of providing adequate security. If it is improperly used, however, and human nature creeps in, then it would not even keep journalists and tow-truck operators out for very long.

An illustration, somewhat chilling, of the importance of how a system may in fact be operated so as to defeat itself can be found in the procedures introduced by United States Secretary of Defense Robert McNamara who, upon coming into office in the 1960s brought in a system of "permissive action links" to avoid the inconvenience of someone in the United States Military using nuclear weapons on their own say-so. The arming of the weapons was controlled by devices that would only activate the warhead upon receiving the correct encryption key. That key was carried around in a briefcase known as "the football" by a senior officer who was always right next to the President, who no doubt felt he had control of the nuclear arsenal; a feeling of security.

The orders to implement the system were carried out but the General officers running the Strategic Air Command, perhaps anxious to avoid delays in a crisis, set the keys, it is reported, to 00000000.

This is a story that will be difficult to confirm, but it does fit rather well with some history.

In September 1957, General Curtis LeMay, SAC's Chief of Staff, briefed two visiting members of a review panel that was to report to President Eisenhower, the Gaither Committee. They were Robert C. Sprague, an electronics manufacturer, and Jerome Wiesner, who became President Kennedy's science adviser and then president of MIT. Sprague noted a wall chart of response times that indicated that none of the SAC bombers would be able to get off the ground by the time Soviet bombers were located by the radar network in Canada.

LeMay agreed but added, "I will know from my own intelligence whether or not the Russians are massing their planes ... for a massive attack against the United States." He is reported to have then said, "If I come to that conclusion, I'm going to knock the shit out of them before they get off the ground." Sprague pointed out that this was not national policy to which, he says, LeMay replied "No, it's not national policy, but it's my policy".

An important consideration for the design of a secure system will be to make it so that it cannot be defeated from within.

What could we deliver that will meet the needs of the users? It ought to be as secure as the hypothetical system we have considered when that system is operated properly and should be designed to force proper operation so that we do not deceive ourselves into a false sense of security.

Returning to our resource considerations; what is the fastest, easiest and cheapest way to meet the system requirements?

How much existing equipment can be used and what needs to be added? We would look first for off the shelf equipment that could be used or adapted for use.

A solution which suggests itself is to use the existing well proven technology of packet radio, at whatever frequency is the best fit for the task and exploit the reliability of that method to send text messages rather than to try to use voice. Contemporary software allows text files to be sent as attachments to the packet radio message and readily available encryption programs of respected pedigree can be used to encrypt the plaintext before sending it as an attachment. The use of mailbox facilities makes it unnecessary for the sender and receiver to be on the air at the same time so messages could be sent at any time and read when the addressee has the time to access their electronic mailbox.

The security will be first rate if the key is made and handled properly so keys of appropriate length and randomness could be created in advance, copied, distributed and held by the intended users of the system in sealed envelopes. A supply of these keys could be provided and, for instance, numbered so that the message could contain the relevant key number in the plaintext part of the

message. Without access to the key itself the encrypted attachment is secure. The keys could be changed as desired. The person who receives the message reads that key number so and so has been used and, using a computer running the same encryption program, enters that key as the "password" and the message is decrypted.

This is capable of early implementation at a nominal cost. The distribution of the keys must be done in advance but a practical key control system is a simple clerical task. The envelopes containing keys would have to be securely held and a system put in place to report any loss of security over a key so that it does not get used.

The encryption algorithm that is chosen could permit various key lengths so there will be a capacity to select a higher level of security when necessary and to implement it easily.

Holding the decrypted information is something which needs to be thought about and a system for secure deletion of plaintext from the computers which are used can be employed.

We can easily and quickly offer the civil authorities reliable and highly secure communications at nominal cost. These are desirable qualities in a system that we can easily make available but hopefully will only have to use for training.

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Shanghai'd to BY4AA

A visit to China and the BY4AA Amateur Radio Club

Thomas E. King VK2ATJ

This article was written to let Australian Amateurs know something of amateur radio operations in China and how they might operate amateur radio when visiting China

Though there are around 80 club stations in Shanghai, Mr. Chang, General Secretary Engineer of BY4AA at No. 111 Guangzhong Road, Shanghai, tel. (86) 21 5665 0674 explained that BY4AA is the main club station in the city. (Have your hotel write the address in Chinese if you plan to make the trip by taxi to this or any club station.)

Browsing through the logbook of BY4AA is like scanning the pages of the "International DX Callbook". There are call signs and comments from amateurs around the globe who have visited China's largest city and operated the main Shanghai club station of the Chinese Radio Sports Association, (CRSA).

Founded on April 3, 1964 – and celebrating its 40th anniversary in 2004 – the CRSA's paramount goal has been to popularise amateur radio activities in China. While early endeavours concentrated on developing radio sports, notably high speed telegraphy and amateur radio direction finding, the past 25 years has seen the organisation helping schools and youth centres train newcomers in radio communications. During much of the past 2-½ decades the CRSA has also been involved in setting up club stations across much of the People's Republic. Today there are more than 150 club stations.

There are two requirements to set up any amateur radio station in China. The operator must have an "Operator's Certificate" which can only be obtained after successfully passing an examination. As well, the operator must have a "Station Licence" to own and operate transmitting equipment. Because China has not signed a reciprocal agreement on amateur radio operations with any country, foreigners cannot obtain a station licence. Consequently, they are not allowed to set up their own stations. "However after obtaining an 'Operator's Certificate for Visitors' foreign amateurs are permitted and warmly welcomed to operate the many

Chinese amateur radio club stations", Mr. Chen Yun Chang, General Secretary Engineer, BY4AA, told me through an interpreter.

The procedure to obtain an "Operator's Certificate for Visitors" has been greatly streamlined in recent years. Today there are only four simple requirements to obtain this document:

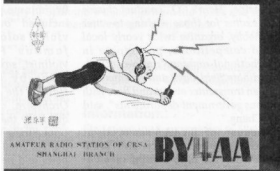
1. A copy of the document page of your passport.
2. A copy of your home amateur radio licence.
3. A passport size photo.
4. An application fee of about \$7.40.

These items need to be sent to the Chinese Radio Sports Association, PO Box 6106, Beijing 100061, P.R. China. For further details e-mail crsa@hellocq.net

According to official figures there are 900 licensed members of the CRSA. In addition, the CRSA has around 8400 associates; the rest are SWL members or radio enthusiasts. The annual membership fee in the CRSA is about \$1.65. It costs about \$3.30 for a year's subscription (4 issues) to the society's amateur publication.

The State Radio Bureau, a government agency within the Ministry of Information and a body similar in operation to our ACMA – issues station licences to Chinese citizens. The CRSA, on the other hand, an organisation

similar to the WIA, conducts regular training courses in many cities and is responsible for conducting the exams. The cost for an Operator's Certificate (including the examination) and the station licence fee (including the inspection of transmitting equipment) varies between grades of certificate and



BY4AA sends these colourful QSLs to acknowledge radio contacts around the world.



Thomas E. King, VK2ATJ, discusses amateur radio with Mr. Chang at BY4AA.

locality of the inspection. However, it is normally less than \$18.

There are five grades of Operator's Certificates. Levels 1 and 2 allow access to all amateur radio bands with powers levels of 100 W and 1000 W, respectively.

"In addition to meeting and assisting foreign amateurs, officers at BY4AA coordinate amateur radio activities at the other club stations in the city, send reports to the quarterly CRSA magazine, 'Ham's CQ', conduct classes and exams for those wishing to enter the hobby, organise twice yearly local radio competitions, participate in international amateur radio contests, coordinate field days and orienteering hidden transmitter events and liaise with various government departments", said Mr. Chang.

Because of BY4AA's excellent relationship with city and state authorities the club station receives some sponsorship, he noted, pointing to a long desk stocked with imported HF and VHF radio equipment. BY4AA is a well-equipped station but it's a different story for many amateurs in the city who have a licence but cannot afford imported equipment.

Mr. Chang made a plea to readers of Amateur Radio on behalf of an increasing number of amateurs in Shanghai. "We want to buy your older but still usable HF and VHF amateur radio equipment if it can be obtained at reasonable prices, he said. Contact the club station by mail using the address in the call book (P.O. Box 205, Shanghai) or by e-mail at by4aa@21cn.com

Shanghai has had a long association with wireless communication. In fact, the city is the birthplace of China's broadcasting service. It was on January

23, 1923 when technicians employed by the Osborn Radio Station climbed to the rooftop of the Dollar Co. to commence the first radio broadcast. The one hour and five minute program included "overtures, violin solos by a famous Prague violinist, saxophone solos by George Hall of the Carlton Orchestra, chamber music by the Golden Gate String Quartet, dance music, local news and news from other parts of China, the USA and Europe." The broadcast was received on some 500 receivers. Many of these were built by radio enthusiasts. The station founded by an American journalist by the name of Osborn operated on a wavelength of 200 metres and a power of just 50 watts. There were only a dozen or so radio stations in Shanghai before

1931. By the end of 1932 the number had escalated to 49. Most of them were operated by local Chinese.

Soaring 468 metres and built in a unique design of interconnecting balls and columns to give the impression of pearls dropping onto an emerald plate, the Oriental Pearl TV Tower is the third highest such structure in the world. (Only the 553 metre CN Tower in Toronto and the 535 metre Moscow TV Tower stretch higher into the stratosphere.)

Though it has an array of equipment to serve the transmission requirements for the city's 10 radio stations and 9 TV channels, tourists come to admire the sleek concrete and pink glass construction and look over the sprawling city from its lofty observation deck positioned some 263 metres above the wide streets of ultra modern Pudong.



There are great views from the Oriental Pearl TV Tower, the third highest in the world.

China: Ham Hints and Travel Tips

Flights:

The country's flag carrier, Air China, has daily non-stop Boeing 777 flights between Sydney and Shanghai, the entry point for an increasing number of Australians visiting China. The country's flag carrier connects Melbourne and Shanghai three times a week. (More than 245,000 Australians visited the People's Republic in 2003.)

For details of flights, fares and specifics about other destinations on the network contact Air China, Level 11, 115 Pitt Street, Sydney, NSW 2000, tel. (02) 9232 7277, fax (02) 9232 7465, e-mail: syddcca@airchina.com.au.

Accommodation:

There is a vast range of accommodation in the city ranging from simple but comfortable guest houses to swank, high-rise hotels comparable to the best in the world. Located opposite the Shanghai Stadium, minutes from a multi storey shopping centre filled with computer software and hardware and only metres from a station on the efficient and low cost metro line, is the Hua Ting Hotel & Towers, tel. (86 21) 6439 1000, e-mail: huating@huating-hotel.com. Next to this 1008 room hotel is the more modest but very comfortable Hua Ting Guest House, tel. (86 21) 6439 1818, e-mail: htghmo@sh163e.sta.net.cn

Shopping:

The Chinese do not yet manufacture amateur radio equipment although their domestic electronics industry is staggering in size and scope. There are, however, a number of markets devoted to selling test equipment, components, tools and consumer electronic products.

The computer market not far from the Hua Ting Hotel is within the Meiluo Shopping Centre. Get off at the Xujiahui metro stop. The largest electronics market, however, is on Beijing Dong Road not far from the No. 1 Department Store in the central city. Get off at the People's Square metro stop. This is the same stop for the wondrous Shanghai Museum with its priceless treasures from the Silk Road and a grand theatre where you can see Shanghai's awesome acrobats.

Nightlife:

You can easily spend all of your evenings spinning the dials at BY4AA or one of Shanghai's many other club stations. Or you can enjoy the 24/7 city after the sun goes down. Stroll down the busy Bund when floodlights illuminate the many old buildings, dine on a choice of cuisines in Face, a former mansion from 1936 or cruise the Huangpu River and see the spectacular Oriental Pearl Tower glisten in the night sky.

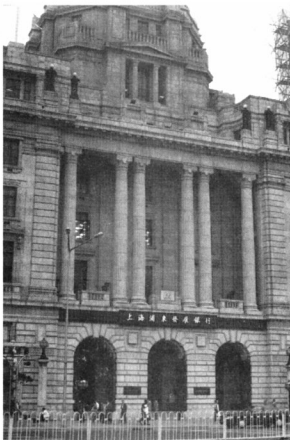
Tours:

Some Australian travellers opt to explore China on an independent basis with only air flights, transfers and hotels confirmed before their departure. This ensures sufficient free time for operating amateur radio club stations found in virtually all major centres.

Numerous escorted holiday packages are also available in Australia that feature Shanghai as the sole destination or include the metropolis in combination with other Chinese cities. For instance, Helen Wong's Tours has a 4-day China Encounter package in Shanghai for travellers wanting an introduction to the city and its amateur radio opportunities.

In addition, a 13-day China Odyssey Tour includes the highlights of Shanghai, Guilin, Xi'an where the Silk Road started, and the not-to-be-missed Beijing with its multitude of attractions. Prices start from \$2740.

For a detailed 52 page 2004/2005 China brochure see your travel agent or obtain a copy direct from Helen Wong's Tours, Level 17, Town Hall House, 456 Kent Street, Sydney, NSW 2000. Enquiries can be made by calling 1 300 788 328



Many of Shanghai's buildings from the 1920s and 1930s can still be seen on the Bund.

or emailing hwtaus@helenwongstours.com. Log on to www.helenwongstours.com

Information:

Start planning your itinerary of Shanghai and other parts of China with free brochures, maps and travel advice from the China National Tourist Office, 11th floor, 234 George St, Sydney, NSW 2000, tel. (02) 9252 9838, fax (02) 9252 2728, e-mail: chinainfo@canto.org.au. Log on to www.cnto.org.au

Additional detailed information on the city is available from the Shanghai Municipal Tourism Administrative Commission, tel (86 21) 6439 8947, fax (86 21) 6439 1519. Log on to www.tourinfo.sh.cn. This friendly fact-filled office can also supply details of other markets and bazaars that will be of interest to radio amateurs, short-wave listeners and computer enthusiasts.

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New lights in the sky

Earth generated radio lights up the ionosphere

Bill Isdale VK4TWI

At 06.41 UTC on 10th March 2004 near Gakona, Alaska, about 200 kilometres north from Valdez, a new light in the heavens was visible to the naked eye. Speckles of light with a wavelength of 557.7 nm, giving a colour towards the yellow end of the green part of the spectrum of visible light, were observable for 7.5 seconds and then disappeared for 7.5 seconds at an azimuth of 204° and an elevation of 75°. They were observed to be in the E layer of the ionosphere and at an altitude of 100 km. The speckles were contained in an area of 26 by 37 km.

This phenomenon was produced by the High Frequency Active Auroral Research Program, HAARP, a United States military project. The ionosphere was illuminated by the radio frequency energy beamed up by HAARP, 95 Megawatts on a frequency of 5.95 MHz. The half power contour of the beam produced the visible response from the E layer. Scientists Todd R Pedersen of the Space Vehicles Directorate, Air Force Research Laboratory and Elizabeth A Gerkin from the Department of Electrical and Computer Engineering, Cornell University published the results of this experiment in the journal Nature on 3rd February 2005.

This was not the first time that an artificial aurora had been created but was a first for radio induced optical emissions bright enough to be seen with the unaided eye.

Influencing the ionosphere has a history. Above Johnston Atoll, a remote Pacific Ocean location, Operation Hardtack 1 was carried out at 12.30 AM on 12th August 1958. The operation involved launching a rocket carrying a 3.8-megaton W-39 thermonuclear warhead to evaluate it for use as an anti-ballistic missile defence. Detonated at about 40 km altitude, above the pressure of most of the atmosphere, the warhead, codenamed Orange, produced a display looking like a golden bowl with a pink and blue corona above it. It

also produced something unexpected. High frequency radio communications around Australia were blacked out for nine hours and the electromagnetic pulse destroyed electronics on the island. This made some people think.

It certainly didn't make many people talk. Cold War information security was in place and there was no explanation for the loss of radio communications at frequencies which depended on the ionosphere for propagation. What had happened was, reduced to its essentials, quite simple. The detonation had produced a lot of energy which radiated into the ionosphere over a wide area. The initial pulse of electromagnetic energy had fried local electronics within line of sight and sent out a lot of noise at radio frequencies, but that was a short duration effect. The disruption of the ionosphere lasted much longer.

The physics operating here is that high energy x-rays and gamma rays collide with gas molecules in the upper atmosphere and break the molecular bonds, producing charged particles. Liberated electrons are pulled along the lines of force of the Earth's magnetic field. As they move and accelerate through the magnetic field, a low frequency electric field is produced which reflects from the ionosphere and propagates around the planet. The accelerating electrons produce increasing frequencies until the disruption extends throughout a

broad high frequency band. Although the potential would be less than a millivolt per metre, large voltages will be induced in long cables such as power and telephone lines.

The Earth's magnetic field pulls charged particles into the Van Allen radiation belts which surround the planet in a toroidal shape, the inner belt starting about 600 kilometres above the Earth. The charged particles will be gradually pulled into the belt and the ionosphere will stabilise.

The unexpected effects from the detonation of Orange led to a more specific test, Operation Fishbowl, again from Johnston Island. The device, Starfish Prime, was detonated at 12 am on 9th July 1962 after a Thor ballistic missile carried it to an altitude of 400 km. The detonation created a light green artificial aurora which lasted for about a second before turning to a red, due to the excited oxygen atoms, which persisted for seven minutes.

Circuit breakers tripped out from induced over-voltages and cut the electricity on Oahu Island, Hawaii, 1300 km away. The W49 warhead was set to

deliver its lowest yield, 1.4 megatons. It could have been adjusted to deliver up to 5 megatons. Local radio and telephone systems on Oahu failed for a short time. This was anticipated, but it was not over yet. The clouds of charged particles were at the altitude where low earth orbit satellites were operating. Those days there were only a few, but over several months seven satellites, a third of the fleet, were heavily damaged. It was like bringing the Van Allen radiation belts to the satellites; they were cooked.

Operation Fishbowl continued with the detonation of the Checkmate device at 145 kilometres above Johnston Atoll at 11.30 pm on 19th October 1962. With a yield of about 60 kilotons it made a green and blue sphere surrounded by a red ring. Above the atmosphere there is no fireball. This test of a smaller weapon indicates a realisation that the effects could be studied locally without creating widespread disruption to power and radio, and without wiping out your own satellites. In August 1963, the Limited Test Ban Treaty was signed by the US, the UK and the USSR banning nuclear testing in the atmosphere, oceans and

outer space. The treaty was ratified into US domestic law on 7th October 1963. Edward Teller, remembered as the father of the hydrogen bomb, testified to the US Senate that, "if you ratify this treaty...

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you will have given away the future safety of this country".

Large scale manipulation of the ionosphere has given way to smaller scale experiments with limited energy. The E-Bomb is a demonstration of the ability to apply conventional explosives to produce an electromagnetic pulse for local effect to turn off the lights and communications.

Moving to low altitude use of low powered devices is a natural progression, since a large disruption of the ionosphere will be likely to wreck many of the approximately 250 satellites that are in low orbit, providing military and civilian communication and other services. The large and immensely costly photographic surveillance satellites are in low orbits as are the iridium communications satellites.

Shielding orbiting electronics with Faraday cages and designing for tolerance to electromagnetic pulse will add weight and cost as well as reduce bandwidths of components that then have to be redesigned to meet specifications. Civilian operators won't pay the enormous cost of a satellite able to withstand what will probably never happen. To cope with the energy from more likely events, such as severe solar activity, they are more likely to temporarily shut down vulnerable equipment and orientate the satellite to face away from the direction of the radiation. That works only for predictable energy disruptions, but the sun is carefully observed and warnings of its activity are distributed widely.

In the event of radiation damage to a satellite, there is nothing to be gained by quickly launching a back up, it will be damaged as well. There is nothing to do but wait for the disturbance to settle, unless of course the ionosphere could somehow be stabilised.

The dangers of electromagnetic disturbances at high altitudes are well appreciated by military organisations. On 25th January 1995, a four-stage Black Brandt X-II research rocket was launched from Andoya Island, near Tromsø, Norway. The procedure for notifying the Russians of the intention to do this wasn't working awfully well.

Russian radar stations identified this as a Trident missile launched from a submarine off North Cape and issued an attack warning. The Russian General Staff believed the eight W-88, 475 kiloton warheads carried by a Trident missile would be detonated high over their country to blind their radars and jam communications so as to provide cover for a full-scale attack.

Then President Yeltsin, Defence Minister Grachev and chief of the General Staff, General Mikhail Kolesnikov, conducted a three way video conference until, after eight minutes, radar tracking showed that the trajectory of the rocket was taking it to a splash point off Spitsbergen, not over Russia. An unfortunate misunderstanding did not result in a disastrous response, illustrating the old adage that he who hesitates is sometimes saved.

Clearly, HAARP, being a military project, must have a military purpose or it wouldn't get any funding. Why heat up the ionosphere? An answer may be in the basic behaviour of charged particles in magnetic fields, specifically the geomagnetic field. The dipole field naturally directs charged particles, be they from the solar wind or an artificial source, to the poles. When such a particle nears a pole it slows until it stops and is reflected out along the field line it is on. The point of reflection is called its mirror point.

The altitude of the mirror point is determined by the angle between the linear motion of the particle along the magnetic field line and its spiral path around the field line.

A particle which is more or less parallel to the magnetic field line can reach its mirror point at an altitude low enough to collide with gas molecules and lose energy, giving an aurora. This is more likely below 100 km from the surface. Higher than that, the particle will remain free to rebound. The aurora is bleeding excess energy out of the ionosphere.

If that natural process could be enhanced, disruptions of the ionosphere could be stabilised more quickly than would occur naturally. In research conducted in the 1970s and 1980s, scientists from Stanford University used very low frequency radio energy, below

20 kilohertz, and beamed it into the Van Allen belts from a transmitter relatively near the South Magnetic Pole, which was over the ocean at the time.

They sometimes caused resonance. HAARP is doing this. By turning its high frequency transmitter on and off it changes the temperature, and therefore the conductivity of the auroral electrojet. This modulates it to produce extremely low frequency or very low frequency waves to nudge the charged particles out of orbit so that they dissipate their energy into an artificially enhanced aurora which will ground the energy that would otherwise damage satellites. If such a system can be made practical, then it would be the functional equivalent of running a giant cable up to connect the "polluted" band of space to the ground and suck the energy out of it before it could damage valuable satellites. The damage from the tests in the 1960s took months to occur so correcting the cause in days or weeks could be sufficient.

The cost of such a project would have to be economical compared to the immense cost of hardening satellites. It can be located on the ground where it is easily and relatively cheaply built, maintained and upgraded. It only needs to be turned on if required. Its existence means that hostile manipulation of the ionosphere will not be effective so there is no reason for anyone to do it. If it works, it will most likely never be used. It will sit quietly as a disincentive, a deterrent that has no obvious potential for harm even if used; which is probably a good reason to build it.

With no military advantage to be had from disrupting the ionosphere we can be confident that it will be there when we need it.

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Sitting at history

Mawson of the Antarctic's desk supports amateur's radio

Allan Doble VK3AMD

We dream of finding treasure maps in antique furniture. 'Snow' Campbell VK3MR found some papers at the back of an old desk he bought in 1930. This was treasure of a different sort. He had bought the desk that had been Sir Douglas Mawson's workplace during his Antarctic explorations.

This story started in September 1987 when I was at a luncheon, which the Radio Amateurs Old Timers Club holds twice a year. I was sitting next to my friend, Myrvin 'Snow' Campbell, a long time amateur radio operator like myself. He was known all over the world by his call sign VK3MR. In conversation he mentioned that the desk on which his radio gear was assembled had been bought by him at Beecham's Auction Rooms in Melbourne in 1930, and that it had come from the ship "Aurora" used by Mawson in 1911/1914 and later Shackleton in 1914/1916.

Mawson's name was apparently mentioned at the auction. Snow bought it because it was the size he wanted, not because it had historic value! When he got it home he pulled out a drawer that would not close fully and found a mass of paper behind it. When Snow told me the story I urged him to write his story and let us have photographs, which he did.

We published the story and photos in the RAOTC magazine OTN (Old Timers News) in March 1988 (issue No 20). At that time I made up my mind that, if I lived longer than Snow, I would do all I could to make sure that the desk would live longer than me and, if possible, be given to the Australian Antarctic Division for preservation and display.

The mass of paper 'Snow' found behind the desk drawer consisted mainly of letters written while the "Aurora" was trapped in the ice, and which, sadly, had not been posted when Shackleton left the ship.

More importantly for this story is the fact that the rest of the paper was over 400 hand written pages, combining a day to day diary and copies of radio messages exchanged with other ship and shore stations during the period 1st January 1915 to 16th April 1916. The radio operator on Shackleton's expedition was Lionel Hooke (later Sir

Lionel Hooke) who, in 1930, was the Manager of AWA in Melbourne, and was the writer of the documents.

'Snow' Campbell handed in the letters and the other documents to the AWA office for Lionel Hooke, who was overseas at the time. When he returned to Melbourne, Mr Hooke wrote to 'Snow' on an AWA letterhead, thanking him for this action. 'Snow's' family still have that letter which proves that the desk was indeed from the "Aurora" and therefore had a unique place in Australian Antarctic History.

So it was assumed that the documents might have been held by him or the AWA company. They were, in fact, handed to the Mitchell Library section of the NSW Public Library early in 2001. The man who brought them to the Library was none other than Mr John Hooke, the son of Lionel Hooke.

John Hooke quite naturally believed that his father had possessed them since

leaving "The Aurora" in 1916. Mr. John Hooke was understandably surprised that they had been in the desk from 1916 to 1930.

I was able to send John Hooke a copy of the issue of OTN magazine No 20, March 1988, in which Snow Campbell told the original story about his purchase of the desk. This magazine also contained a copy of Lionel Hooke's letter to Snow Campbell thanking him for the gift of the documents.

When Shackleton came back to Australia late in 1916 he sold the ship in Sydney. In 1917 the "Aurora" set out for South America with a cargo of coal. It was never seen or heard of again, and is presumed to be somewhere at the bottom of the Pacific. While people must have wondered what had happened to it, no one ever wondered if any part of it had survived, let alone the interesting double sided desk that had been used by Mawson and his ship's captain in



Photo 1: The Governor General signing the VIP visitor's book.



Photo 2: Marjorie Campbell and Allan Doble with His Excellency.

1911/1914, and by Shackleton and his ship's captain in 1914/1916.

'Snow' Campbell died on 28th December 2000. I spoke with Snow's widow Marjorie and his family, who were well aware of the desk's historical importance, and suggested they think of locating it at Antarctic Division Headquarters in Kingston near Hobart. 'Snow's' family liked the idea and authorised me to open negotiations.

I spoke with Mr Andy Smithers, the Antarctic Division's librarian and curator. He was surprised when I told him that the desk used by both Mawson and Shackleton on the "Aurora" not only existed, but that it was in my power to arrange for it to be a gift to the National Antarctic Division, if it was wanted. Of course, it was wanted. There were to be two very strict conditions to the gift.

One, it would be on permanent display in a prominent place (most museums have more material than display space and rotate items). Two, on the desk would be the story of its origins and the name of the giver. The appropriate letters were exchanged by Mrs Marjorie Campbell and the Antarctic Division, but it was a few months before Mrs Campbell and family finally told me they were ready to let the desk go.

A carrier was located who drove around Hobart collecting goods, ferried them to Melbourne, where he made deliveries and then collected goods. He collected the desk from the Campbell home near Frankston, and delivered

it to Antarctic Headquarters about 24 hours later. The Division paid the freight. The desk did not go on display until February 2004 because of planned alterations to the main building where it would be displayed, and the erection of three new buildings, a program that was only completed in 2004.

Since 1997, all had wondered what

had happened to the documents given to Lionel Hooke by 'Snow' in 1930. About three years ago I found that AWA in Sydney (the firm that had supplied Mawson with his Marconi and Telefunken radio equipment on his way to the Antarctic in 1911) had ceased all manufacturing and trading in the field of radio and all their business documents covering their long history were in sealed boxes in the Mitchell Library section of the State Library of New South Wales.

I had several telephone conversations with Executives of AWA and several exchanges of correspondence regarding my search for the documents handed to Lionel Hooke in Queen Street in 1930, in the hope that they might be known to be in one of these boxes, perhaps among personal papers of the late Sir Lionel Hooke.

The company had no knowledge of the documents but, very graciously, sent me a letter authorising me to search for them among the sealed boxes if I so desired, together with a copy of a letter to the Mitchell Library authorising them to allow me to make the search.

I did not feel up to the task and so did not take up the offer, but around this time I had some exchanges of correspondence and telephone conversations with Ms



Photo 3: Back row (from left to right): Margaret Smith (Doble), Mrs Mariena Jeffery, Ms Campbell, Ms Campbell

Middle Row: Mrs J Campbell, Allan Doble, John Campbell

Front Row: His Excellency Major General Michael Jeffery AC, CVO, MC (Ret'd) and Mrs Marjorie Campbell

Meredith Lawn, the Librarian of the appropriate section of the Library.

Late in December 2001, Ms Lawn rang me and said, "we have your documents - they are from Shackleton's expedition and written by Lionel Hooke". Minutes later I was on the phone to Andie Smithers in Hobart to tell him the Library would be willing to make copies available to the Division. Therefore, it came about that a book made of reduced size copies of the 400 or so pages is on permanent display on the desk on which they were written all those years ago.

Friday, 13th February 2004, was the 50th anniversary of the date on which Philip Law landed his expedition on the Antarctic coast and set up Mawson base. On that date this year the Governor General, Major General Michael Jeffery, was at Antarctic Division Headquarters at Kingston, a suburb of Hobart, to name and to declare open the three new buildings and the refurbished building in which the desk is on display a little way inside the front door. Mrs Marjorie Campbell and family, and myself with

one of my daughters, were there by invitation from Canberra.

His Excellency the Governor General was very interested in the desk, its history and the story leading to its present location. He had a brief chat with us early on, and then a longer talk before he left after he and his good lady had signed the special VIP visitor's book, open on the desk. He held up the proceedings for a few minutes on his tight two hour schedule. On the desk there is a card which tells the story of the desk. Also on the desk is a frame. On the left side of the frame is the letter from Marjorie Campbell telling about 'Snow's' RAAF and POW experiences, his purchase of the desk and her gift of it to the Nation.

The right hand side of the frame shows 'Snow' in front of the desk and his rig back in 1930. The background to the photo (which was published on the front cover of OTN magazine No 20 in March 1988) is a typical array of QSL cards from all over the world. His Excellency picked up and read the card, moved along and

read the letter, studied the picture, and then had a short question and answer session with us while his official party waited. He was impressed and delighted with the fact that the historic desk had not only been found and preserved, but that it was a free gift to the Nation. His parting words were that he considered this to be a wonderful example of public spiritedness, and with that he resumed his journey to his waiting car.

The still outstanding mystery is where and how the desk, with its slightly open drawer, remained undisturbed from 1916 when the ship was sold until 1930 when 'Snow' Campbell bought it at auction. It is only a guess but I have often wondered if it may have been taken ashore from 'The Aurora' by Captain J K Davis who came to Melbourne and became the Director of Shipping in Victoria.

Footnote: During his formal address his Excellency pointed out that Australia now controls 42% of the Antarctic continent, a land mass nearly the same size as Australia.

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The Wireless Institute of Australia

ACN 004 920 745

Election of Directors

Call for Nominations

Pursuant to clause 14.1 (c) of the Constitution the WIA Board has determined that the election of directors shall be conducted by postal ballot.

Three directors appointed by clause 12.6 (b) of the Constitution retire at the conclusion of the next Annual General Meeting which will be held at a time and a place to be announced but not later 31 May 2006, namely Philip Wait, Edward Thrift and Trevor Quick. Each is eligible for re-election and each offers himself for re-election.

Nominations are called for from others also seeking election as a director of the WIA.

A director must be a voting member of the WIA and must hold an Australian amateur radio licence.

Any person wishing to nominate as a candidate for election as director of the WIA must deliver or cause to be delivered to the Returning Officer by not later than 31 January 2006:

A statement signed by the candidate signifying his or her willingness to be a candidate for election as a director together with:

the full name, age, occupation and callsign of the candidate, and

such other biographical details or other information as the candidate wishes to accompany the ballot papers, but in all not exceeding 250 words.

Delivery to the Returning Officer may be made by hand
when the WIA national office is open at:

Suite 10, 229 Balacava Road,
Caulfield North,
Victoria 3161

or by mail to:
PO Box 2175
Caulfield Junction,
Victoria 3161.

Nominations received by facsimile or by electronic means cannot be accepted.

David A Wardlaw, VK3ADW
Returning Officer

To DX beyond the western sky

IOTA on Dirk Hartog island

Nigel Dudley VK6KHD

"Go west, young man".

In Australia this exhortation would lead you to Dirk Hartog Island, the western most point of Australia, which is where this intrepid bunch of DXers found themselves.

An IOTA activation is a good chance for the average amateur to hone up his skills as an operator, camper and general adventurer, especially when the activation is a "wanted" one. Degrees of difficulty in getting to islands vary from the simple to the totally crazy.

The islands off the Western Australian coast present the full range of challenges such as Rottneest which is simple, to the extreme like some of the groups off the Kimberly coast that have been activated over the last few years. Dirk Hartog probably lies somewhere in the middle.



Photo 1 - Campsite at Louisa Bay on the east side of the island about 40 km from the landing point. Low scrub and sandy but excellent fishing and easy to erect antennae.



Photo 2 - The low band operating tent with the Force 12 Sigma XK40 antennas in the foreground. One is set for 20 m and the other for 40 m to allow quick change over.

Dirk Hartog Island is the most westerly part of Australia. Separated from the mainland by a narrow passage of water about one kilometre wide, it is about 70 km long and averages about 10 km wide. The first European foot was in 1616 when Dutch sailor Dirk Hartog landed at what is now known as Cape Inscription and left an inscribed pewter plate with details of the visit. First European occupation was in 1869 when a pastoral lease was granted and a thriving wool industry

established which continued until the late 1960s. The Wardle family purchased the Island and the number of sheep was reduced until, today, pastoral activities have ceased and the Island is an eco-tourism destination run by the family. From July 2006 the island will be managed by CALM, a Western Australian government instrumentality, as a conservation area with the family retaining a small private holding.

The island is wild, wind blown and an experience. With no public access and no made roads, only rough tracks, current policy is that only eight visiting vehicles are allowed at any time. These must be 4WD with good ground clearance. Access is by a barge operated by the Wardle family and must be booked well in advance.

The island falls within the West Australian group for IOTA having the designation of OC 206. Wally VK6YS, after other successful island activations that included Browse OC-234, Pasco OC-071, Viney OC-266 off the Kimberly coast, and Breaksea OC-243 off Albany in the south, decided that Dirk Hartog was the next good candidate for activation as its standing in the IOTA "most wanted" list was high. Dan VK8AN, a veteran of the previous expeditions, and Nigel VK6KHD, who had participated in the Breaksea activation, agreed to come along. Jane, Nigel's XYL also agreed on

the condition she was allowed to fish and not be bothered by the radio stuff!

Our plan was to spend a long weekend on the Island, hopefully to work as many contacts as possible coinciding with the weekend openings into North America and Europe. Dan flew down from Darwin to Perth on the Thursday before the weekend and we set off early on the Friday morning in two vehicles loaded with supplies and radios. A nine hour drive from Perth saw us at Steep Point late on the Friday evening in anticipation of crossing the following morning to the Island. The drive to Steep Point is not for the faint hearted as it is 750 km from Perth with the last 100 km being dirt road, 30 km of which is 4WD only and very corrugated in places.

Early on Saturday morning the barge picked us up and we made the crossing. The barge takes only one vehicle at a time, loaded from the beach and after a crossing of about 15 minutes landing is made on the island, also on a beach. With both vehicles safely offloaded we set out for the homestead and eventually the designated camping grounds. We settled on setting up camp at Louisa Bay



Photo 3 - The operators - from the left Wally VK6YS, Nigel VK6KHD and Dan VK8AN complete with IOTA flag given to Wally by the RSGB IOTA after a previous expedition.

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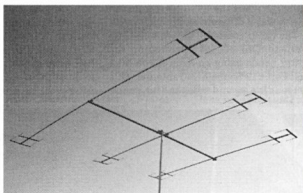
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Complete kit: \$255 incl. GST.

See Website www.tet-emtron.com
for dealer list.



Photo 4 - Wild flowers were in abundance as a result of good winter rain. Travelling on the island was a visual delight.

about halfway up the Island. The choice was dictated by being able to get close to the sea and it being relatively sheltered, although when the wind blew from the east it was a different story!

The camp consisted of two operating stations. One station operated on the lower bands using an Icom IC706 Mk2 and Force 12 Sigma XK40 antenna. This antenna is a ground independent, centre

fed vertical dipole used successfully on previous expeditions; it has the advantage that two can be set up to provide gain and directivity although this configuration was not used on Dirk Hartog. The second station was a Yaesu FT817 and Palomar amplifier into a half wave sloping dipole set against a 6 m aluminium mast and tuned to 15 m. After working several of these types of

operations we are firmly of the belief that lots of power and gain antennae are not warranted. When the bands are open, and with modern alert systems via the DX cluster, etc, being the wanted station is no barrier to communication provided good operating practice is observed.

Power came from batteries, backed up by a very reliable Honda EU20 generator. These generators are also economic to run as the 240 V is generated by a solid state inverter and engine revs are automatically governed to load. Fuel economy is important as we had to carry all fuel and water requirements, making for heavily loaded vehicles. Despite the solid state design, making the EU20 RF quiet is a challenge, especially under the low background noise conditions experienced in locations such as Dirk Hartog. Home-brew line filters using wire wound toroids were employed and this removed a lot of the noise, but the best filtering appeared to be simple 150 mm loops of at least six turns of the extension cable at strategic points along the power feeds.

A 64 watt solar panel topped up batteries. Laptop computers were used for logging and auto Morse code generation, powered from inverters with the radios from switched mode power supplies, or direct from battery; none of these gave interference.

We operated two stations as band conditions permitted. Although separated by only a few metres, cross band interference was eliminated by using band pass filters. The ICE filters were imported from the USA and have a 0.25dB injection loss for an out-of-band rejection of 35 dB. They were highly successful as one station worked away on 15 metres and the other on 40, 30 and 20 metres as if the other did not exist.

First contacts were made on the Saturday afternoon with openings into Europe and Asia on 20 and 15 metres. A scattering of VE stations also appeared but, by the early evening, the bands closed. Early on Sunday morning 40 metres CW was operated with mixed results and a move to 20 metres sideband was more successful. The greatest disappointment of the weekend was working 40 metres; time and time again we would be wiped out by contest stations in Europe simply treading over the top of our signal. Some might say that more power was needed but this probably would not have made much difference. The problem was the



Photo 5 - Dan and Wally operating on 20 m. Note the lack of a Morse key. All transmitting was done via the keyboard, but receiving was strictly by ear!

Amateur Licence Reform

– just in time?

A Linton-Harrison Report

Jim Linton VK3PC and Roger Harrison VK2ZRH

There are signs that the serious decline in amateur radio in Australia that has occurred since the mid-1990s may be turning back. While total Amateur licensee numbers are still declining, the rate of that decline is levelling off, thanks to a growth spurt in Novice Limited licensees since 2002 and also, surprisingly, in Limited licensees.

A new era in Australian Amateur licensing began on 19 October this year. The past five-tier licence structure is replaced by a three-tier licence structure that includes the promising new entry level Foundation Licence. Restructure had been widely anticipated for some years and seems to have influenced both prospective, existing and some former licensees, as reflected in the Amateur licensing trends since 2002.

Part of that change, the end of the mandatory Morse code proficiency qualification for access to the HF bands, which saw the introduction of

HF privileges for Australian no-code licensees on 1 January 2004, had also long been expected. It, too, is reflected in the licensing data.

What happened?

Total licensee numbers peaked at about 17,500 during the early 1990s and levelled off. They began to decline from 1996, which has continued to the present. Table A tells the story.

Over the nine years 1996-2006, the Unrestricted Licensee numbers had a steep decline losing 1991, or 20.2%, the Novice ranks fell 934, or 43.5%

During this same period the Novice Limited gained popularity, adding 363 licensees, or 155.8%. The Intermediate and Limited licensee numbers fell, but nowhere near the numbers recorded for the Unrestricted and Novice.

In August 2003, the then Australian Communications Authority (ACA) issued its Discussion Paper "A Review of

Amateur Service Regulation". From the resultant review process the Authority introduced HF privileges for former no-code licensees on 1 January 2004. In May 2004, the ACA published its "Outcomes of the Review of Amateur Service Regulation", which foreshadowed this October's new licensing regime.

Amateur licensee numbers from immediately before the ACA review and after the outcomes were announced – which we've dubbed "pre-Review" and "post-Review" – reveals some valuable lessons for us all before the impact of the new three-tier licensing structure takes effect. Table B tells the story.

Over the pre-Review – post-Review period, Novice Limited numbers rocketed by 240. This is two-thirds of the total growth for the licence grade since its introduction in 1995. Over this period, the Limited Licence regained popularity to such an extent that licensee numbers grew, adding 175.

continued next page

ACMA Amateur licence statistics	Oct 1996	Oct 2005	loss or gain	per cent
Unrestricted	9852	7861	-1991	-20.2
Intermediate	1397	1313	-84	-6.0
Limited	2973	2714	-259	-8.7
Novice	2148	1214	-934	-43.5
Novice Limited	233	596	363	+155.8

Table A. Amateur licensee trends, October 1996 compared to October 2005. From data published by the Australian Communications and Media Authority (ACMA)

ACMA Amateur licence statistics	Oct 2002	Oct 2005	loss or gain	per cent
Unrestricted	8473	7861	-612	-7.2
Intermediate	1334	1313	-21	-1.6
Limited	2539	2714	+175	+6.9
Novice	1490	1214	-276	-18.5
Novice Limited	356	596	+240	+67.4

Table B. Amateur licensee trends, pre-Review (October 2002) compared to post-Review (October 2005). From data published by ACMA.

Dirk Hartog *continued*

total absorption of the other operator in attempt to achieve his objective, and no regard for other operators trying to work the rare IOTA. Sunday saw ongoing QSOs throughout the day as conditions permitted, openings being patchy on 15 metres with 20 m the most reliable. The evening opening into Europe on 15 and 20 metres was good while it lasted and it was especially nice to hear operators remark, "Thanks for the new one"; it makes it all worthwhile. 15 metres was

prematurely closed as a broadband "woodpecker" interference started up and we could not copy anything under its 9+ signal. The noise continued until the bands closed.

Propagation on Monday morning was again poor and the day was spent mostly relaxing, taking photographs and then packing up camp to move back to the landing point for the transfer back to the mainland the next day. A total of 562 QSOs was made over the

two day operating period. A modest total perhaps, compared to other IOTA activations that we had participated in but, none-the-less satisfying. The thrill of working a dog pile when it happens is something every amateur operator should experience.

Further information on the Island is at <http://www.dirkheartogisland.com.au/index.htm>

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Intermediate licensee numbers fell marginally, but Unrestricted and Novice licensee numbers continued to decline significantly. Thirty per cent of the decline in Unrestricted licensees since 1996 occurred in the past three years.

Clearly, this picture indicates a maturing of the no-code Novice Limited licence as an entry point into the hobby and as a launching point for upgrading to the Limited Licence, which itself also gained popularity.

The Novice Limited growth was probably also due to an increased awareness over 2002-05 of its certain enhancement with HF privileges to come in the near future. It can be safely assumed that all 240 of the Novice Limiteds gained during this period were newcomers to amateur radio.

Similarly, Limited licensee numbers swelled as a result of anticipation of enhanced privileges. Most likely, a proportion of the 171 Limiteds gained over the pre-Review – post-Review period would have been newcomers, the remainder resulting from Novice Limiteds upgrading and lapsed licensees returning to the hobby. There is some evidence, both anecdotal and from on-air activity, that a notable number of lapsed Limited licensees have resumed their hobby, perhaps due either to changed personal circumstances or awareness of the increased scope for individuals now available in amateur radio.

Intermediate licensee numbers stagnated over 2002-05, although they gained identical privileges to Unrestricteds on 1 January 2004. This didn't seem to attract sufficient lapsed licensees to boost the numbers, or perhaps there haven't been too many lapsed Intermediates anyway.

The number of silent keys every year is a contributing factor to the decline in Unrestricted licensees. It affects all licence grades to some extent, now.

The graph in Figure 1 illustrates the whole picture, from when the decline in Amateur licensing began in 1996 through to October 2005, when the old five-tier licence structure ended.

The lessons

Was the review just in time to 'stop the rot' afflicting the hobby in Australia? If the decline in total numbers continued at the 2002 rate, in about 15 years for licensee numbers to fall below 10,000, if the rate of silent keys didn't

accelerate. Would that few make the hobby unsustainable? There's no clear answer to that.

One lesson for the immediate future is to encourage lapsed licensees to return to the hobby, as the evidence in the case of Limiteds shows. Lapsed Novice and Intermediate licensees may return now that they're able to take up a Standard licence, with its enhanced privileges compared to what they had in the past. But they have to know about that. Publicity will be the key.

The effect of dropping the mandatory Morse code proficiency has is a clear signal. This, and access to more bands has engendered renewed interest, as the licensing data shows. These factors released a measure of pent up demand.

Australian amateur radio is not out of the woods, yet. However, the new Foundation Licence, offering a new entry level, seems to be building an encouraging level of interest. November estimates show some 400 people waiting for the new licence's introduction in October. That may translate into 1000 newcomers taking the Foundation

Licence exam in the first full 12 months. This, together with the likely upgrading to occur over the short-term by Foundation licensees moving up to at least the Standard Licence, the decline in radio amateur numbers seems set to be reversed over coming years.

About the Authors:

Jim Linton VK3PC and Roger Harrison VK2ZRH released a discussion paper on the future direction of amateur radio that was published in Amateur Radio magazine. It was recognised by the WIA Publications Committee which gave them the Ron Higginbotham Award in 1985. They last wrote on the subject of the well-being of amateur radio in Australia with the Linton-Harrison Report "Amateur radio and the challenge of change", published in 2003. There was much discussion that continues today about its contents, which included research and analyses of the decline in amateur radio during the previous five to six years. It's available online at www.amateurradio.com.au/lintonharrison/

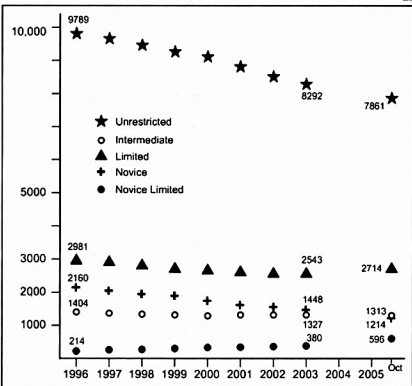


Figure 1. Amateur licensee trends, 1996 through 2005. The up-tick in Novice Limited and Limited numbers between 2002 and 2005 is clearly seen, while Intermediates hung-on. The rate of decline in Unrestricted and Novice licensees over the latter period is also apparent. Compiled from data published by the Australian Communications and Media Authority.

An efficient tuner for small 160 meter verticals

Note:- 1 inch = 25.5 mm and 1 foot = 12 inches

In QST for April 2005, Robert Snyder, KD1VV describes another approach to making a short but efficient 160 metre vertical.

The problem described by Robert was to fit an efficient but electrically short vertical antenna for 160 metres in a relatively restricted area. The vertical wire was 35 feet high with a top-hat loading wire about 56 feet long. In addition there were four radials as a counterpoise, elevated 7 feet above ground and about 75 feet long. Even so, this is still a small antenna for 160 metres, only 0.065 wavelengths in height.

When using the EZNEC modeling program and inserting typical figures for local ground conditions as well as lossless wire, the antenna input impedance would be (6.5 -j530) ohm at 1.85 MHz. This corresponds to a Q of 80 with the 2:1 bandwidth being 18 kHz. If the antenna was tuned to 1.85 MHz using a loading coil of infinite Q, the loading coil would have a reactance of 530 ohm, and coupling to it could be

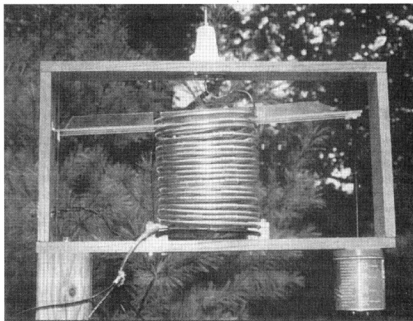


Figure 1 - The tuner assembly with the loading coil at mid position. Motor is in can at lower right

accomplished either with a tap or link, to provide an impedance transformation to 50 ohm.

To avoid significant losses from the loading coil, its Q must be much greater than that of the antenna. It was determined that a 20 turn coil, 7 inches in diameter and wound with ¼ inch copper tubing, would have the inductance required (45.6 µH for 530 ohm reactance at 1.85 MHz) and Q in excess of 900 at 1.85 MHz.

The coil was wound around a 6 3/8 inch diameter cardboard tube, using ¼ inch tube to form a 20 turn solenoid. This required 40 feet of tubing, requiring two lengths to be joined. Silver solder would be best, but normal 60/40 soft solder was used here. The coil was then sprayed with clear acrylic lacquer to deter corrosion. A number of short lengths of ¼ inch ID clear vinyl tubing,

slit on one side, were cut. These were then wrapped around the copper tubing at about ¼ turn intervals on every second turn, to prevent the turns shorting. A flexible lead was soldered onto the top end of the coil to attach to the vertical radiator through the top insulator.

This coil has enough inductance to tune the antenna down to 1.8 MHz when compressed under its own weight. Therefore, the rest of the band can be tuned if the coil can be stretched to reduce its inductance. This stretching is accomplished by a jackscrew and lever arrangement described below. A motor turns a threaded rod, which causes a nut to rise or fall, depending on the direction of travel. A plastic lever arm, attached to the top of the coil and hinged at the other end, is raised or lowered by this nut. Figure 1 shows the final arrangement in its wooden housing with the coil

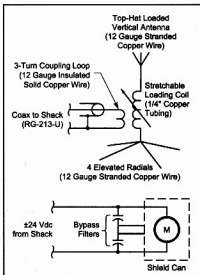


Figure 2 - Schematic diagram of antenna system with its remotely tuned loading coil, link coupling coil and elevated radials. The DC motor drives the jackscrew to stretch the coil

stretched to about mid position. The plastic lever arm is suitably reinforced to prevent bending and is hinged at the left side. The threaded rod is on the right side with the geared down motor underneath in a metal shielding can.

Link coupling was chosen to couple the antenna to the 50 ohm coax line. This 3 turn coil is held in position about 1/4 inch below the loading coil, using two wooden blocks. The antenna is connected through a ceramic insulator to the top of the coil and the counterpoise is connected to the bottom end. Given the low radiation resistance, the high Q of this antenna and its good efficiency, RF currents and voltages can be quite high so good connections are a must and attention should be taken to the possibility of arcing. The schematic of the overall antenna system is shown in Figure 2.

The motor used was specified as a 30 r/min at 12 V dc. The speed is not too important, but the motor will need to deliver sufficient torque to stretch the loading coil fully. Given the high RF fields in the vicinity, it was considered prudent to put the motor in a metal

container, as much for shielding as weather proofing.

It is important to minimize the amount of metal (especially ferrous) near the loading coil, as they could degrade the Q of the coil. The threaded rod is 3/8 inch diameter Delrin, hand threaded. The lever arm is plexiglass and most of the nuts and bolts are nylon. The nut and hinge are metal but don't seem to create any problems.

To provide protection from the weather, the housing shown in Figure 3 is made from corrugated plastic sheet. Any other material that is weather proof and non conductive should be suitable for a housing.

The tuning is conducted remotely from the shack with a power supply and reversible switch. The tuning is carried out at low power and the system tuned for minimum VSWR. Minimum VSWR is less than 1.1:1 across the entire tuning range.

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Figure 3 - The tuner assembly, enclosed in its weatherproof 'birdhouse'. The assembly is supported on wooden 4 x 4 post, which also supports the elevated radials.

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The WM1 was originally designed in 1986 in the Autek tradition, time was taken and they got it right the first time, and there have only been minor changes since. In 1991, The RF head was compensated to make it useable to 54 MHz. More recently the peak power decay time was increased in response to requests. Lastly, back lighting on both meters was included.

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All displays and plots are derived from these four measurements: **S21 Magnitude:** gain or loss of two-port network from input to output. **S11 Phase:** the transfer phase of two-port network from input to output. **S11 Magnitude:** return loss of one-port or two-port network referenced to input of the network. **S21 Phase:** the phase angle of return loss of one-port or two-port network referenced to input of network.

Specifications

Freq Range: 1 MHz-120 MHz at full spec. Operational with degraded perf. up to 120 MHz down to 200 kHz.

Resolution: 0.1 dB for amplitude measurements 1 degree for phase measurements

Dynamic Range: In forward mode, 80 dB at lower frequencies 75 dB mid-range and higher frequencies In reverse mode, 35 dB at lower frequencies

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Model 516 Argonaut V IF-DSP QRP Transceiver



IF-DSP, modern 20 watt HF transceiver. 20 watts output power, all modes, SSB, CW, digital modes, and FM. Front panel adjust 1-20 watts output. AM operation at 5 watts carrier power (20 watts PEP).

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No more under-desk acrobatics to connect up antennas. LDG DTS-4 Desktop Coaxial Switch switch between 4 antennas with the press of a button.



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Autek Antenna Analysers
Autek RF 2kW in-line Power meters
LUT Lutron
Lutron Measuring Instruments
Vantage Pro Weather Stations

VK2

Tim VK2ZTM.

Seasons Greetings from the Council and volunteers of Amateur Radio New South Wales. As year's end approaches, the Parramatta office will close mid month and reopen about mid January. The final VK2WI morning and evening news session for the year will be on Sunday the 18th. During the holiday break there will be a morning only session until a date in January, yet to be determined. For 2006, the VK2WI team requires more volunteers for both sessions. The roster is a bit light on at the moment, resulting in some of the team having to attend many times in the quarter. Each session requires two or more persons on site. Not everyone in attendance requires to be licensed and it is an opportunity for those with reading interests to be the announcer. Anyone interested should contact the roster coordinator, John VK2JIV or the Parramatta office by phone or e-mail. Telephone 02 9689 2417 or vk2wi@ozemail.com.au

AR-NSW provided Amateur Radio House as the venue for the Sydney accreditation training and on the first weekend this month conducted their first training and assessment course. Terry VK2UX, AR-NSW Education Officer is looking for volunteers to assist with future weekends. Courses will be conducted at intervals determined by the demand. Previously, AR-NSW conducted exams every six weeks. The coordinator of those exams, Pat VK2JPA has retired from the position after many years of dedication to their operation. Council extends their thanks to Pat for her efforts with this service to the hobby.

AR-NSW has offered use of Amateur Radio House to clubs and groups who do not have suitable locations to conduct their assessment weekends. The library area has chairs and desks as well as the VK2AWI station for the practical.

AR-NSW introduced a tender system for the disposal of surplus equipment. The first cycle closed mid November and those successful were able to collect at the Trash and Treasure which was scheduled to be conducted at VK2WI Dural, at the end of the month. The tender details are to be found on the web domain www.arnsw.org.au

A conference of VK1 and VK2 clubs was jointly sponsored by the WIA and AR-NSW at Parramatta last month. Most clubs wind up their activities for the year this month and many take a break until February. To keep all informed, it is asked that clubs and groups provide VK2WI News - before 18th December - with their schedule for the first couple of months of 2006. One exception is the Coffs Harbour club who often hold a field day around the second Sunday in January.

VK3

Barry Robinson VK3JBR

Website: www.amateurradio.com.au Email: arv@amateurradio.com.au

Seasons Greetings

What a year it has been, with plenty of activity involving Amateur Radio Victoria. This will appear in the annual reports presented at the Annual General Meeting to be held in May, 2006.

One activity was the successful special event station AX3ITU celebrating 140 years of the International Telecommunications Union. For the first time Amateur Radio Victoria took part in the International Lightship and Lighthouse Weekend from the Williamstown Lighthouse and Timeball Tower.

Final plans are being made for the Members' Think-Tank, to look at the future direction of this organisation. Ideas had been raised in relation to member activity and hopefully these can be brought to reality.

Also the first of the Foundation Licence training courses and assessment sessions have been held in Victoria,

following on the earlier successful session on the Gold Coast.

Every active radio amateur has a role to play in providing an inviting atmosphere on the amateur bands and where appropriate a bit of friendly guidance.

On behalf of Amateur Radio Victoria Council, I wish you all compliments of the season and a Happy New Year.

End of year and election

Our Ashburton Office closes on Tuesday 20 December and it reopens Tuesday 7 February. During the break urgent matters will be given priority. Office-bearers will also be engaged reconciliation of bank accounts, other financial statements, stocktaking and an annual audit.

Nominations for the 2006-2009 Council can be made on a form available from the Secretary. The deadline is 2.30pm on Thursday 23 February, 2006.

Notices of Motion, for the AGM to be held on Wednesday 24 May, close on the same day.

A replacement Company Secretary is required from the membership to fill the position becoming vacant with the retirement of John Brown VK3JJB. Anyone interested to learn more should contact the President, Jim Linton VK3PC.

Missing e-membership services?

If you are a member of Amateur Radio Victoria but have not supplied your email address, then please do so to help us keep you better informed about our organisation.

Send your email details to arv@amateurradio.com.au or visit our website to register online for access to the Members Website.

VK5

Christine Taylor VK5CTY

Adelaide Hills Amateur Radio Society

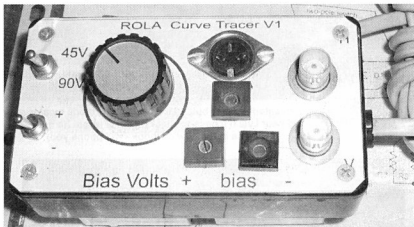
The last meeting was a Show and Tell. The variety of items and the talks were very interesting and gave the members some new ideas for their own projects, I'm sure. The lecturers were kept busy

answering questions all through the tea break.

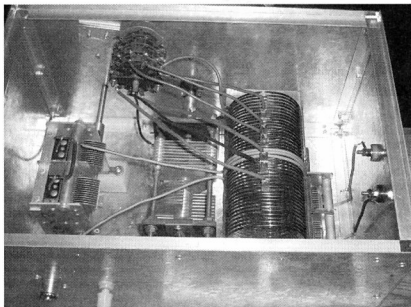
Some photos illustrate some of what we saw.

By the time you read this AHARS will

continued next page



A curve tracer made by Graham VK5ZFZ.



Another antenna tuner made by Horst VK5ZLW. He not only made the antenna tuner, he made the tuning capacitor from aluminium sheets and copper rod!

Royal Cook Island Amateur Radio Club

Kia Orana! (Greetings!)

For those amateur radio operators and their families visiting the Cook Islands in the holiday season, December 05 and January 06, please make a note of the following:

To obtain a local ZK1 Cook Island Amateur Radio licence, either in advance or on arrival in Rarotonga, Cook Islands please have a copy of your original Australian VK licence together with a NZ \$20.00 licence fee:

Contact: Mr. Papeiha AVIU

Telecom Cook Islands

POBOX 106, Avarua, Rarotonga, Cook Islands. South Pacific.

Phone: (682) 29682 Fax: (682) 26174

Email: papehia@telecom.co.ck

Amateurs active in Rarotonga are Jim ZK1JD, Victor ZK1CG, John ZK1AX. Most check into the afternoon ANZA net or Inter Island Nets on HF (High Frequency).

Active on Aitutaki is Des ZK1DD and James ZK1DG.

Des Clarke ZK1DD and his wife Queen Manarangi have the Club equipment & antennas on Aitutaki at Gina's Lodges.

Des has access to the family owned Akaiami Island in the Aitutaki Lagoon, where one can be alone on the island to use one's radio. A real Robinson Crusoe experience!

Go to www.cookpages.com/GinasLodges-Aitutaki/ to learn more.

Or contact Des ZK1DD directly on Phone/Fax: (682) 31-058

Or email: queen@aitutaki.net.ck

I welcome in advance those amateurs and their families holidaying in the Cook Islands.

Enjoy and have a safe trip.

Kia Manuia! (Farewell!)

James Goodger ZK1DG

Email: pukapan@yahoo.com

VK5

AHARS continued

have had their Buy and Sell. Whether it was only a matter of 'your junk is now my junk' or something new for the shack, you can be sure everyone met some old friends or made some new ones.

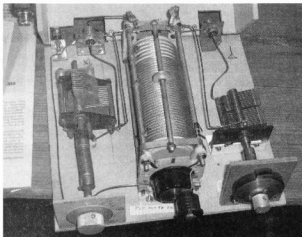
The AHARS Buy and Sell is the one day of the year when VK5 amateurs meet and greet as much as buy. A great day is had by all.

The next official meeting of AHARS will be on Thursday 16th February 2006. If you are in Adelaide on any third Thursday of the month, please contact Jim VK5NB or Leith VK5QH for information. Everyone is welcome.

AHARS has a collection of video tapes (or DVD) of lectures given to the club. If you would be interested to borrow a copy, please contact Jim or Leith to arrange this.

Congratulations to the Gold Coast Radio Club for being so prompt with their first Foundation License Course. AHARS will run a similar course some time in the new year.

Best wishes to amateurs everywhere for the Festive Season from the committee of AHARS. See you in the February issue.



An antenna tuner built in a wooden box, made by a new amateur Lyle (I'll have to check on his callsign. He may not even be in the new callbook - will phone you)

Old Timers' Luncheon in VK5

Unfortunately this year's luncheon was not very well attended although there were some welcome new faces. The members held a minute's silence for the SKs during the past year, including the President who had been ill for a number of years, but enjoyed still being able to act as President.

The meal was up to the usual standard and so was the display provided by Vaughan Harvey from his historical collection.

Vaughan brought along a National HRO, wartime receiver that had pleasant memories for many who had used these during their years in the services.

Unfortunately, Vaughan had to confess that although he had restored the set to look as it once had done, he had not been brave enough to power it up for fear of destroying it.



The National HRO receiver on display at the Old Timers' luncheon.

Jamboree on the Air – Oct 15th 2005

The Kidman Park Scout Hall was all set up to greet the outside world. They had gone to a lot of trouble with posters, radio equipment, plenty of networked computers set up in different rooms for different functions.

A pump up mast was borrowed and raised to about 50 ft (16 m) supported

with many guy wires, supporting a multi band dipole and a "long wire". When the HF propagation was not good they used Internet chat to contact many countries. VK6 was contacted on HF.

The UK, America and Canada were contacted using IRLP, also a scout group at "Yundi" SA on VHF. Scout leaders

also talked to each other when the attending Scouts "were stuck for some thing to say" or were allured away to different activities.

One scout leader had just finished working for his Duke of Edinburgh Award, and one young girl was going for her Baden Powell Award.

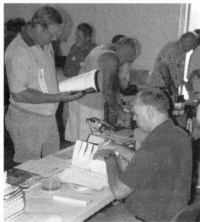
33 Jenny

VK4

Gold Coast Amateur Radio Society

Laurie VK4VCC

These pictures were taken at the Gold Coast Amateur Radio Society Inc Radio and Electronics Fair held recently. It was well attended and the Foundation Licence table did great business.



Above: The crowd gathers for the Lucky Door Prize.

Left: Ron Bertrand VK2DQ, Manager of the Radio & Electronics School promoting the Foundation Licence.

VK7

Justin Giles-Clark, VK7TW

Email: vk7tw@wia.org.au Regional Web Site: reast.asn.au

2005 Sewing Circle BBQ

Hearty congratulations to Ken VK7DY and Wendy for again organising and hosting the Sewing Circle Barbeque at his QTH at Orielton, 30 km east of Hobart. 71 people enjoyed the day, 39 of them amateurs with many young people attending. There was representation from all over Tasmania.

The homebrew first prize went to Trevor, VK7TS for his Linear Amplifier. The Sewing Machine Award was announced and went to Elwyn VK7EH

in absentia recognising his commitment over many years to the Sewing Circle Net. The VK7HTW (Silent Key) 2005 Encouragement Award went to Damien, VK7HDS in recognition of the work he has done to promote amateur radio to the CB fraternity. Thanks to Max, VK7KY and Wendy for providing the valuable raffle prizes.

Great company, very pleasant surroundings and fantastic weather made for a wonderful day.

JOTA in VK7

The JOTA weekend saw a flurry of activity across VK7 with groups in the North West, North and South.

In the North the following amateurs were involved: Phil VK7JJ, Dion VK7YBI, Greg VK7YAD, Jason VK7ZJA, Colin VK7ZCF, Karl VK7HDX, Rick VK7HBR, Kevin VK7ZPE, Roy VK7ROY, Tony VK7NAU, Wayne VK7XGW, Allan VK7AN, Tony VK7YBG and catering by Anne Eagling.

In the South the following amateurs were involved across five different groups: Rod, VK7TRF, Paul VK7PA, Graham VK7ZGK, Ken VK7DY, Roger VK7XRN, Gary VK7JGD, Peter VK7TPE, Damien VK7HDS, Danny, VK7HDM, Ray VK7VKV, Chris, Aaron, Reg VK7KK and Brian VK7HSB.

Thanks go to all volunteers who attended the various sites around the state and those amateurs who attended outstations and made contact. This is a great opportunity to show young people what fun amateur radio can be and get them interested in the hobby. You have all done VK7 proud!

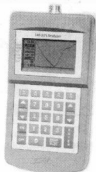


Sewing Circle BBQ attendees checking out the buy and sell tables!



Analizers for:

- * 0.1-50MHz Complex impedance
- * Antennas (140-525MHz shown)
- * Time Domain Reflectometer (TDR)



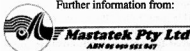
Convert your analogue transceiver
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The AOR ARD 9000 series digital
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OR
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BPL Interference Watch

The BPL vigil continues with rollout activity in Mt Nelson and Tolmans Hill and infrastructure appearing in Newtown and Lenah Valley. I encourage all amateurs and HF CB operators to head up to Mt Nelson and take a listen to what BPL sounds like. Keep writing those letters to the newspapers, politicians and the ACMA. We need to keep the pressure on.

North West Tasmania Amateur Radio Interest Group

IRLP nodes appear to be breeding in the NW, with three now available. All these Nodes are sponsored by NWTARIG through the facilities of VK7AX. Node 6700 linked to VK7RAA serves the North & N/East. Node 6124 (Echolink node 100478) linked to VK7RNW serves the Central Coast and Node 6616 (Echolink node 152375) linked to VK7RMD serves the NW Coast.

Northern Tasmanian Amateur Radio Club

In November we were treated to two meetings. The first on the 2nd saw a very interesting talk from Mr David Hamilton, Senior Officer of Forest Education. Mr Hamilton's talk was on both sides of the forestry debate. On the 9th, Michael Owen, VK3KI, President WIA gave us a

talk on the National WIA. We had about 25 people attend at the QTH of David, VK7HAH, a great night.

Radio and Electronics Association of Southern Tasmania Inc.

The big news in the South was our first Foundation Licence course on the 19-20 November, full a few days after advertising it! By the time you read this we will have our first VK7 foundation licence holders. If you wish to reserve a place for the next available session please contact Reg, VK7KK on 03 6248 6824 or regemm@ozemail.com.au.

R5 the Snug Tiers repeater is now on air TX: 146.850 MHz and RX: 146.250 MHz. Callsign VK7RHT. By late November, thanks to the Tasmanian Small Craft Marine Radio Group, R5 and R2 at the Domain will be linked. This will provide much greater coverage for Southern VK7. Thanks to all involved.

Our November meeting on the 10th was a BBQ and talk by Michael Owen, VK3KI on the formation of the National WIA. We had about 22 people attend and many interesting questions were asked. Michael was treated to a BPL tour before continuing his Tasmanian holiday.

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Michael, VK3KI addressing REAST members



VK3KI deep in conversation with Rod, VK7TRF, Reg, VK7KK, Eric, VK7TAS and Dietmar.

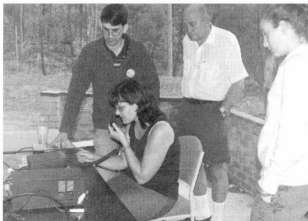
Congratulations Amanda Gray!

Congratulations! ALARA is thrilled that the very first foundation licence holder is a YL. With the callsign VK4FRST everyone will know just who they are talking to when they hear Amanda on air.

I rather hope Amanda will join ALARA, the Australian Ladies Amateur Radio Association. We will have to make sure that the VK4 Rep sends Amanda an application form.

The ALARA Contest results are elsewhere in this magazine but our congratulations go to Rosanne VK4NAW for her sterling effort in amassing 528 points. Even with the triple points for contacts with early members, that is a mighty score.

Some of the comments added to the log sheets can be repeated here. Such as "It must be the most leisurely contest in the calendar", or "Thanks for a great, friendly Contest" – comments made by OMs illustrate just the feeling we want for our Contest. Conditions were good though there were not as many DX contacts as there have been in some years, but those of us there had a great time.



Amanda VK4FRST, flanked by encouraging onlookers, operates on 2 m

JOTA participation

I have no photos, but I know that a number of VK5 and at least one VK3 ALARA member participated in JOTA this year. I am sure there were others. Maybe next year you will tell me – and even send me pictures??

Jeanne VK5YQ went up to Woodside to help run the station there for scouts and guides. Jenny went with her OM Kevin

VK5AKZ to the Kidman Park Group. This group is led by Brian VK5PBL. For many years Brian has spend JOTA at Yundi helping Rufus, VK5YO with the Black Forest Scouts and other troupes who came to Yundi, but this year he stayed with his own troupe for the first time. Most of the group attended but there were not many YLs among them.

Maybe after Jenny was there this year the girls will have a go next year.

Pat VK3OZ helped out at her local Scout Group in Turadin, on Westernport Bay, and Shirley, VK5JSH participated at the Morphet Vale Scout Hall. At both venues there was some lively interest in the radio experience including IRLP.

Sponsorship is very rewarding

Almost from its inception, ALARA has had DX members through sponsorship. A VK member sponsors a DX YL and usually is sponsored into the overseas DX YL association. We write to each other if we cannot make contact on air. Email has made correspondence almost as instant as on air contacts, recently, but however we 'talk' we make friends and learn about other places.

When there is a reciprocal sponsorship we get magazines from overseas and 'meet' even more friends. If we are lucky enough to travel to our DX friend's country we can meet for an eyeball as I did this year in the UK. If you haven't yet sponsored anyone, I suggest you do so soon. Contact Maria VK5BMT QTHR the callbook. She will be delighted to help you.

Sponsorship in ALARA

For some years now I have sponsored Jasmine G4KFP into ALARA. We have never spoken on air but have kept in touch by e-mail. Jenny MW0BET I have only sponsored for a year or so. I in

exchange am sponsored into BYLARA.

Once I knew when I was going to the UK and would be reasonably close to Jasmine and Jenny in Blackpool (as part of a tour of the Lake District), I sent each of them a postcard with dates. To my delight they both wanted to see me as much as I wanted to see them.

In the event Jasmine and her OM Billy came to Blackpool and took us for a tour of parts of Lancashire we had not seen, including Morcombe Bay. Eric Morcombe of Morcombe and Wise took his stage name from the bay. The conversation never waned. We had a lovely day together, one we will remember for years to come.

On another day Jenny met us at the Warrington railway station and took us to see the Anderton Boatlift, just over the border in Cheshire. Again a great day. We



Jenny MN0BET and Christine VK5CTY

Spotlight on SWLing

Robin L. Harwood VK7RH

The year that is rapidly drawing to a close has been an eventful one. Just recently, momentous decisions were announced about the future of the BBC World Service.

On the 25th of October, Nigel Chapman, Director of the BBC World Service, announced the biggest transformation of the BBC World Service since the end of WW II indeed of the most far-reaching since the BBC began international broadcasting more than 70 years ago. Ten language services will be slashed in March next year, and an Arabic TV service added, changing the emphasis of BBC World Service English programming.. Mr. Chapman put the target audience into these in three categories:

"The first are opinion-formers and decision-makers -we will target them in every market.

Secondly, people needing basic news and information -as targets in developing markets.

And, thirdly, audiences for lifeline services in areas of profound conflict and failed states."

The need to utilise other technologies and platforms will also be accelerated as the BBC bureaucracy considers that shortwave usage is declining. With this in mind several language services will be closed, including Bulgarian, Croatian, Czech, Greek, Hungarian, Polish, Slovak

and Slovenian. Two Asian languages, Kazak and Thai will also go because of their relatively low market impact. However the Thais are not happy with this decision and protested.

The closure of the eight European language services ends a chapter in history, because it built up a loyal audience during and after WW II and into the Cold War period. A viable independent media has emerged since the demise of the Iron Curtain and the BBC's audience also has shrunk. English language programming will however continue to these regions.

The focus of English programming on the BBC World Service will be on news and current affairs and away from other forms such as music, drama and sports. It sounds similar to the fare we get presently on "BBC World" on the PAY-TV platforms here in Australia. The BBC news and current affairs staff will be downsized and some 236 posts will close across BBC World. At the same time, around 200 new posts will be created, presumably in the new BBC Arabic TV service.

Sadly it is no longer the BBC World Service we grew up with. True one can connect to the various BBC domestic networks online but this is no substitute for listening on your radio. It is now possible to even get the BBC via your

mobile phone but this is far from free.

In the October column, I said that the amount of DRM transmissions will be increasing during this period.

John L. Cartmill, VK4BJ, has informed me that this month Deutsche Welle will increase DRM output. Presumably this includes 9680 from 0600 which has caused comments that the DRM mode is taking up too much bandwidth. It would be a better idea for DRM to be on channels away from the normal DSB mode. John is getting good reception of the BBC on 9470 in DRM.

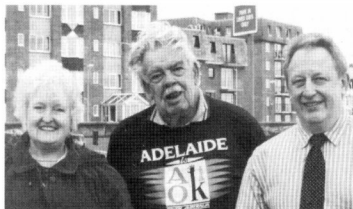
In late October, I received my copy of the 2006 edition of the Passport to World Band Radio. It is 592 pages yet there seems to be over 20 or pages of ads for Eton Radios, the successor to Grundig.

China and Tibet are the focus of this year's edition. It has reviews of various SW receivers to suit all budgets but seems to be a rehash of reviews from previous editions. The blue pages are there again with listings of who and what is there. However it would help if they would indicate DRM services. PWBR 2006 was a little disappointing and is the same format it has used for some time. Perhaps it is a reflection of the decline of Short Wave activities.

Well that is all for this month. May I wish the Season's Greetings to you and yours and look forward to 2006.

ar

ALARA continued



Jasmine G4KFP, Geoff VK5TY and Jasmine's OM, Billy

all found the boatlift interesting and enjoyed a ride on a canal boat, down the lift and for a short trip along the Weaver

River. Once more we found plenty to talk about and were sorry when the day ended.

We would have never met these nice people without the ALARA sponsorship system. What is more, other travellers have also been able to enjoy similar experiences.

If you would like to be part of the ARARA sponsorship scheme then please contact Maria VK5MT QTHR in the callbook.

Best Wishes + DX Before Dishes

From all in ALARA to all other amateurs.... Have a great Christmas and celebrate the New Year safely but enjoyably. May there be much DX before dishes in your lives.

ar

SSETI launch successful but short-lived

The SSETI Express satellite was successfully launched at 06:52 UTC on Thursday, 27 October 2005 on board a Kosmos 3M launcher. One hundred and three minutes later, exactly on schedule, the first signals were heard at the ground station in Aalborg, and two-way communication was established. Some problems began to surface during the deployment of the "cube-sats" and these have resulted, at the time of writing, in the SSETI operations being put into standby mode. The SSETI Project Manager, Neil Melville posted this very detailed message on 1 Nov and it's worthwhile listing the main points here. Everyone remains hopeful that the SSETI will be recovered so that the other amateur radio experiments can be given a run.

Here is Neil's report:

The SSETI Express student microsatellite mission has been a remarkable success, achieving its two first mission objectives and a number of important milestones. Due to a failure in the electrical power system on board, the spacecraft is inoperable and mission control is on "standby". There is a small but significant possibility of recovery, the likelihood of which is being ascertained by ongoing testing. The educational goals of the project continue to be met by the student teams who are still working hard to analyse and understand all available data, such that the lessons learned can be applied to future missions.

1. Objective 1 is fulfilled: Reaching the launch pad after progressing through the challenging and rigorous acceptance process is a major milestone demonstrating the capability and applicability of the SSETI Program itself and all of the student teams involved.
2. Objective 2 is fulfilled: All evidence suggests that the three Cubesat passengers were successfully deployed into orbit by SSETI Express and were hence able to begin their own independent

missions. The Cubesats Xi-V and UWE-1 are alive and well, the status of NCube-2 has yet to be confirmed.

3. SSETI Express booted up in orbit and transmitted its first data back to earth precisely on schedule. This data was received and decoded by the primary ground station and several others. This confirmed that SSETI Express survived its journey into space and was successfully separated from the launcher.
4. The primary ground station established reliable two-way communication with SSETI Express. This was a remarkable achievement further demonstrating the capability of the SSETI Program and all the students involved.
5. A significant amount of housekeeping data was downloaded from the spacecraft, allowing for a detailed analysis of the situation on board. This also involved the global network of radio amateurs, who have given us invaluable support and additional data during this mission.

The problem:

- 6) In order to ensure the safety of the other spacecraft on the same launch vehicle, SSETI Express remained inactive and coasted for 65 minutes before deploying the three Cubesat passengers.
- 7) During this time all the energy gathered by the solar panels was to be dissipated within the spacecraft. Evidence strongly suggests that this dissipation system failed by fusing on, therefore not allowing any energy to charge the spacecraft batteries.
- 8) The battery charge steadily declined during the mission, causing the spacecraft to enter safe mode after approximately 6.5 hours, and eventually shutting it down altogether.

The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for breaking news and such things as software releases. Contact Graham if you wish to be placed on the mailing list.

AMSAT-Australia Echolink Net

The net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0800UTC and you can join in by connecting to the AMSAT conference server. All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034
Graham's e-mail address is:
vk5agr@amsat.org

The outlook:

- 9) Careful analysis of the data received, coupled with ground-based computer simulations and hardware tests, strongly support the proposed theory of a specific component failure in the excess power dissipation system.
- 10) Ground-based hardware tests confirm the possibility of a further failure mode of the specific component, which would allow the batteries to charge and the spacecraft to operate once again.
- 11) Testing is ongoing to ascertain the specific likelihood of (10), and to investigate other possible alternative explanations.
- 12) Given that the spacecraft is currently inoperable, the mission cannot continue as planned. It is therefore on indefinite "standby", pending the technical possibility of re-activation of the spacecraft, as in (10).
- 13) The team remain hopeful and vigilant. The primary ground station and mission control centre are

being configured for autonomous monitoring of the spacecraft, such that if it reactivates the team will be immediately alerted and ready to resume the mission.

- 14) The educational goals of the mission continue to be met daily as we try to analyse and understand the events since the launch.

So there you have the situation as this column goes off to the Editor. Amateur radio satellite operators are continuing to monitor the downlink frequency and of course everyone is hoping for the best possible news for Christmas. As the statement above makes clear, ESA and the SSETI Association greatly value the input that amateur radio operators are providing and are asking

amateurs around the world to continue to check for signals on 437.250 MHz at the appropriate pass times. These signals may be short bursts of 9k6 data every 18 secs or bursts of pulse telemetry every 30 secs. Anyone hearing anything that matches the above detail is requested to please e-mail details to <missioncontrol@sseti.org>.

SuitSat due for launch in early December

At the time of writing there are tentative plans for SuitSat to be hand-launched during a Space Walk (EVA) taking place from ISS sometime around December 8, 2005. These arrangements are subject to last minute changes of course but with luck SuitSat could be in orbit as you read this column. Keep monitoring the ARRL and AMSAT web pages for updates, and of course, the ARISS news services. To refresh your memory, the SuitSat project is a free-floating satellite that will be running on batteries only. The life span of the project will be limited to the lifespan of the batteries. SuitSat may last as little as a week or as long as 6 weeks. It will take the form of a transmitter and computer built into an obsolete space suit which was due to be jettisoned from ISS and be burned up in the atmosphere. The full story of SuitSat is available from the ARRL web site.

SSTV details:

The SuitSat project will transmit 2 m FM on 145.990 MHz. The transmission

sequence will repeat every 9 minutes. Each cycle will consist of telemetry, pre-recorded voice messages and a pre-programmed SSTV image. The SSTV mode will be Robot-36. The SuitSat project is downlink only. There are no up-link channels. Doppler shift on the 2 m FM signal should not be a problem and it should be possible to copy the transmissions on very simple gear. A hand-held TRX should do nicely for the voice messages. To receive the SSTV pictures you will need to connect the audio from your radio to your computer sound card and run some SSTV software. I'll certainly be out in the yard with my laptop computer and IC-2a. I use "MMSSTV", which is available as a free download from the "mmhamsoft" website but there are many more around, some with advanced features like multiple screen operation and a wide range of operating modes. MMSSTV is a nice easy way to get going if you haven't dabbled in SSTV before and simply want to monitor SuitSat. This promises

to be an interesting project so do try to listen in and maybe capture a slow-scan TV picture from space. The Keplerian elements for ISS should be close enough immediately after deployment and SuitSat battery life will dictate the need for updating after a week or so. SuitSat is the brainchild of Sergei Samburov RV3DR. It is aimed at amateur radio satellite users and school students but just about anyone who owns a VHF scanner radio can listen on 145.990 MHz so the audience will be wide. It should be worthwhile setting up your satellite station for SSTV because the new SSTV equipment is now on board ISS and will be set up soon. It will run higher power than SuitSat and will have the capability of transmitting a continuous string of freshly taken SSTV images from the ISS. This feature is long awaited and will continue a tradition started on MIR many years ago of transmitting virtually real time photographs from space via amateur radio.

From ham-radio to Galileo, the SSTL story

The first of the Galileo satellite fleet, ESA and Europe's answer to GPS is due for launch this month. The first pilot spacecraft dubbed GSTB-V2A has been built by Surrey Satellite Technology Ltd. (SSTL) in the UK, a company that was created in 1980. Many satellite

old timers will remember UoSats-9 and 11 and their higher speed digital successors UO-22, KO-23 and KO-25. All these satellites had their roots in the organisation that was to become SSTL. At the time of writing, the ESA website News section has an interesting

retrospective including an interview with Dr Martin Sweeting G3YJO in which he recounts the humble origins of SSTL back in the 1980s and looks to the future. The ESA web site contains much of interest to amateur radio satellite enthusiasts.

Yet another potential threat from emerging technology

One is never too sure these days whether computers are our best friends or our worst enemies. Ham radio has just been through a threatening time with the spectre of OTHR, a technology heavily dependent on computer technology. Then there was the equally dire threat of BPL with its potential to wipe out everything from 1 MHz to 80 MHz.

While neither of these threats has been completely alleviated, it seems that they may not have the devastating consequences we feared. BPL may be doomed to commercial failure and OTHR seems confined to infrequent excursions into only the lower HF bands. Neither seem to pose any threat to satellite operations. However, just when you

thought it was safe to go back into the water – another potential threat emerges. The European Radiocommunications Organisation (ERO) are seeking public consultation on the implementation of Ultra Wide Band (UWB) in the British Isles and Europe. UWB is a wireless version of USB designed to handle high definition video in personal computers

U.K.

Communications Crazes:

Morse ringtones for your cell CW by telephone is the latest craze sweeping ham radio. Well kind of. Ever wish that your cellular phone sounded more like your ham radio station? Well now it can thanks to ringtone programmer and Morse fanatic Andy B M1RGZ.

According to the GB2RS News Service Andy has developed a free-to-use online computer programme to generate personalised Morse code ring-tones for mobile phones.

Ring-tones have become all the rage recently. This, thanks to the multimedia capabilities of the latest generation of cell phones. But there was no simple way of creating Morse ring-tones.

Now, Andy's website - morsetones.no-ip.org - makes it easy. You simply enter a message, choose the ringtone's speed and pitch and press a button. A MIDI file will then be generated that you can copy to your mobile phone. Want to try it? It's as easy as clicking.

(RadCom)

Safety alert:

HP recalls laptop battery packs

If you own a laptop computer manufactured by Hewlett-Packard, listen up. The company has announced that it is recalling around 1,350,000 battery packs for certain HP and Compaq brand laptop computers. This, after receiving reports of overheating and melting.

According to reports, Hewlett-Packard's recall affects HP Pavilion, HP Compaq, Compaq Presario and Compaq

Evo laptop computers that use lithium ion re-chargeable battery packs. The recalled batteries carry a barcode label, starting with GC, IA, L0 or L1 and were sold internationally with new laptops between March 2004 and May 2005.

The company reportedly is in receipt of 16 reports of batteries overheating, four cases out of which have occurred in United States. H-P has advised consumers to stop using the products, and contact the company for a free replacement.

More is on-line at www.hp.com/support/BatteryReplacement (TechTree, PC World, others)

(ARNewsline)

U.S.A.

Video News Corp

Amateur Radio Newsline had an interesting idea.

It has been quoted that over 1,000 Radio Amateurs assisted in the hurricane disasters of both "Katrina" and "Rita" that hit the south coast of the USA. There has been a lot of media hype on the problems with communications, but no one seems to have videos of amateurs in action. A similar situation has occurred with Hurricane "Wilma". Perhaps we are the efficient silent service, or is a picture of someone talking into a hand-held walkie-talkie just not worth shooting? Alan Kaul, W6RCL, has suggested a

Ham Radio Video Corp. It's a thought. However, if you have a video camera, why not take pics and pass them on to your local TV station.

World beacons

During the RTTY contest in October I was amazed at the number of RTTY stations that sat on 14.100 MHz calling CQ, etc. To me this frequency is sacrosanct. I listen here often to find out just how good propagation is from my QTH. Perhaps these keyboard operators are not aware of this excellent world wide service. Whatever, with all the free band space available, I believe contests should be confined to a defined frequency band and any one operating outside should be penalized. Pile-ups in restricted frequencies would certainly expand their skills.

For newcomers to amateur radio 14.100 MHz is one of the frequencies used by the IARU with a continuous stream of some 18 call signs from various countries around the world. Each station transmits for 10 seconds with four different output powers ranging from 100 watts to 0.1 watt. By listening to these stations you can determine propagation from your QTH. There is one down side - it is in Morse code - but then if you are a DX hunter you will know the code. Check out information in the WIA Callbook.

(VK2AYD soapbox)

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WANTED URGENTLY

Articles for Amateur Radio

Technical, club activities, DXpeditions, Field Days, opinion, or whatever your experience is or has been in amateur radio

Address for submitting articles can be found on page 1

AMSAT continued

and television sets and if anything could be described as ubiquitous today it's USB. The technology was first proposed using frequencies in the range 3.1 - 10 GHz which could have consequences for the 5 and 6.5 GHz bands, just as the movers and shakers of our amateur radio satellite community are looking to these bands for inclusion in the next generation of amateur radio satellites. AMSAT-UK,

the UK Microwave Group and BATC have put in vigorous objections and have gained a little ground in that the latest proposals mention only the frequency spectrum from 6-9 GHz for long term development of this new technology. If (when) this technology gets a foothold in Europe or anywhere else it may become a fait accompli. Before we even get to hear about it our computer and

electronics stores, already awash with gizmos capable of wiping out the 2.4 GHz band, could be full of 5 and 6.5 GHz noise making devices. Let's all hope that the intense lobbying from high profile amateur radio organisations across the world can help restrict this threat to non-amateur radio frequencies.

ar

VK4QQ,
P.O. Box 7665,
Toowoomba Mail Centre, QLD 4352.
Email: john.bazley@bigpond.com

As the year draws to a close we certainly have seen activity from some really rare spots during 2005 so I wonder what 2006 has in store, apart from the next major DXpedition – Peter 1 - 3Y0X due to take place in early 2006 – an operation that many of us have been waiting for. I can do no better than draw your attention to the last Press Release.

From: Ralph, K0IR and Bob, K4UEE, Peter I DXpedition co-leaders.

The 2006 Peter I (3Y0X) DXpedition Team announced that it has been awarded a major sponsorship grant by the Northern California DX Foundation, Inc. (NCDXF).

This DXpedition is funded principally by the contributions of its twenty-plus team members, but 30 % of the total cost must come from the DX community. We are extremely pleased that the Northern California DX Foundation has decided to be the DXpedition's largest financial contributor. Their contribution to the 2006 DXpedition exceeds their contribution for last year's postponed effort. The DXpedition leaders and team members thank NCDXF for their continued confidence and support.

In early February, 2006, a multinational team of approximately twenty operators, one explorer, and a professional photographer led by Antarctic DXpedition veterans Ralph Fedor, K0IR and Bob Allphin, K4UEE, will activate Peter I Island. Team members come from France, Norway, Russia, Switzerland, Netherlands, Martinique and the United States, and many possess significant DXpedition and Antarctic experience.

For further information on the Peter I DXpedition, and how to contribute to the success of this DXpedition, go to www.peterone.com.

W7KFI, Susan Meckley, set sail from California aboard the USSV Dharma in late 2001. She is on her way to Phuket, Thailand over the next few years and plans to take multiple stops along the way. Earlier this year she was in Mexico. Shortly afterwards she headed for the Hawaiian Islands. This September she operated from KH6BB during the 60th anniversary of the signing of the WWII surrender documents by the Japanese, on board the USS Missouri. Soon she will be back on her 32 foot

Challenger sailboat and heading to Johnston Island (KH3), which she says has been uninhabited. Plans are to go ashore and operate until she uses up half of her water. Afterwards she will be heading towards the Marshall Islands. If Susan manages to operate from Johnson Island there will be no doubt that she will be in great demand – particularly from Europe.

Members of the Russian Robinson Club (RRC) plan to operate from two IOTA groups in the Seychelles. Exact dates have not been announced, however they did say they would operate from Aldabra (AF-025) and Farquhar (AF-035) Islands for three days each. Team members will include RA3NAN (S79NAN), Sergey: RZ3EC (S79EC), Eugene; and RZ3EM (S79RRC), Andy. They will be using a IC-746PRO, IC-706MKIIG and FT857 along with a TL-922A and Robinson RR-33 vertical and dipoles. The team does have a Web site at <http://www.qso.ru/s79rrc/eng/news.php>. QSL S79RRC via RZ3EC, Eugene Shelkanovtcev, P.O. Box 70, Orel, 302028, RUSSIA. QSL S79NAN via RA3NAN and S79EC via RZ3EC.

5Z4/UA4WHX, Vladimir Bykov, has been QRV from Nairobi, Kenya. Activity has been on 10-80 metres CW and SSB. Victor has been having rig problems. If he can get his equipment problems taken care of he plans to operate from Lamu Island (AF-040). After his activity from Kenya Vlad plans visits to Uganda (5X), Tanzania (5H), Rwanda (9X) and Burundi (9U). QSL via UA4WHX.

A T9 Team is heading for Liechtenstein in early 2006. The team will be T93M, T93Y, T94DX (DJ2MX) and T94J (OE1EMS). They plan to operate as HB0/T94DX during the CQ 160 metre CW Contest on January 28th and 29th.

5H1CM will be on the air holiday style, not QRV around the clock, with DL7CM, Hans, operating. He will be in Tanzania October 23-December 18,

operating on 160-10 m CW, SSB, and RTTY using an IC-706MKIIG and 500-watt amplifier. QSL to his home call, DL7CM.

Rich, PA0RRS will be active from Penang Island (AS-015) from 28 December to 8 March 2006. He will operate as 9M2/PA0RRS, but hopefully he will get an official 9M2 callsign. A trip to Langkawi Island (AS-058) may be possible. QSL via home call, direct (Richard Smeets, Schoorveken 100, 5121 NM Rijen, The Netherlands) or via the bureau.

WRTC 2006 REFEREES --- The WRTC 2006 organisers would like to have the referee team completed before the end of the year. Each of the 45 competing teams will have a full-time Referee to monitor implementation of the rules. Referees need to be fully conversant with all the rules and need to stay awake for 24 hours to monitor their team. They also need to have wide contesting experience on both modes and to be on-site in time for the briefing meetings before the contest. Many applications for this position have already been received, but more would be welcomed, so that the most experienced can be selected for the job. Please send your brief contesting curriculum vitae to these three addresses: py5eg@inepar.com, k1zz@arri.org, g3xw@compuserve.com

P4/OH1VR (Sep) and P4/OH3SR (Juha), will be active from 28th November until 13th December HF SSB and RTTY. QSL via their home calls

C6AYM (Eric-K9GY) will operate from 23rd December until 1st January 2006 on 40-2 m using CW QRP QSL via his home call.

Special thanks to the authors of *The Daily DX* (W3UR) - 425 DX News (11/QJ) and *QTC DX PY2AA* for information appearing in this month's DX News & Views.

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Contest Calendar December 2005 – February 2006

December	3	RTTY Melee	(RTTY)
	10/11	ARRL 10 Metres Contest	(CW/SSB)
	17	OK DX RTTY Contest	(RTTY)
	26	Ross Hull Memorial VHF Contest (to 15 Jan 06)	(VHF+)
January	7/8	ARRL RTTY Roundup	(RTTY)
	14/15	Summer VHF+ Field Day	(CW, SSB, FM)
	28/29	REF Contest	(CW)
	28/29	BARTG RTTY Sprint Contest	(RTTY)
	28/29	UBA DX Contest	(SSB)
February	4/5	Mexico Intl. RTTY Contest	(RTTY)
	11/12	CQ WW WPX RTTY Contest	(RTTY)
	11	Asia-Pacific Sprint	(CW)
	11/12	Dutch PACC Contest	(CW/SSB)
	18/19	ARRL Intl DX Contest	(CW)
	24/25	Russian WW PSK Contest	(PSK31)
	25/26	REF Contest	(SSB)

Greetings to all readers

More with less?

The motto "We Do More With Less" is the slogan of the CW Operators' QRP Club. Many of you will have seen it somewhere and some of you will be members of that Club.

QRP is one of those aspects of Amateur Radio that you either love or sneer at – the argument being "why bust your ears trying to pick out a weak signal, when with 100 watts you can work him OK".

This is not an unreasonable argument, provided that DX and QRN conditions are "reasonable" at the time you want to make your contact.

However, there are some for whom "reasonable" conditions and 100 watts rigs are too easy – no challenge! These joys are supplied by making and operating home-brewed equipment and seeing that everything works properly and to its best ability.

Of course, there is some really good commercially made gear on the market and for myself this would be the way to go for SSB work, unless you are an experienced home-brewer. Against this, a small one or two watt CW transmitter

is not specially difficult and can give great satisfaction. (Would that I had had something like that on my recent trip to VK4, because even though I wrote a few months ago about fitting HF into the car, I finally went with no radios at all.)

I mention this because QRP has a quite large following in many of the American contests and to a lesser extent amongst the Europeans. Looking at some of the USA QRP results, the top scorers are often well on the way to the same levels as the Big Guns. The drives are obviously:

- 1 to have the best antenna systems possible (after all, a beam or stacked array will give proportionally better results to QRP as it will to a kilowatt signal),
- 2 a keen technique of learning to judge just when, where and how to make your call in a contest, and
- 3 sheer dedication.

Admittedly, working from VK or ZL brings many problems of distance to the QRP enthusiast if he is to make it to USA or Europe; but it really teaches how to sharpen one's technique and it

is genuinely good fun mixed with the frustration of having to repeat your callign umpteen times to get through the racket of the kilowatt boys. If you feel like trying something different in a local contest, give QRP a try – even if you just turn down the output of your "big rig".

Two dedicated Australian QRPers that I feel should be mentioned are Doc VK5BUG/QRP (whose signal in the recent RD Contest was magnificent!) and Bob VK2AVQ/QRP, a keen home-brewer who uses his rigs on QRP Nets and in contests.

These are not the only operators in VK working with QRP, but they would be the two most frequently heard by me. So if you ever hear these operators on air, they are well worth talking to about their interest in low-power operating. Doc, I know, has been working on a magnificent vertical for QRP work on 80/160 metres, so I look forward to seeing an article from him in one of the future issues of this magazine.

So if you want something different, try QRP – achieve more with less!

RD Results

As I prepare these notes I have just heard which State won this year's RD Contest, apparently by a very large majority of points (I have not yet seen the scores at this stage).

I trust that you will join with me in congratulating the VK6s – a good effort. However, it again raises the subject of the attempts to revamp the rules that were tried this year. There must be many thoughts amongst you out there, so if you would like to pass them on, please contact either Chris Edmondson VK4AA, or me.

2006 Calendar

Attached is the Calendar of Contests for 2006. Please put this up on your wall for next year so that you will have plenty of time to prepare yourself.

Finally, thank you all for your participation in our contests in 2005. Have a very happy Christmas and New Year and try to take part in the Ross Hull Contest and VHF Field Day in mid-January.

VK CONTEST DATES 2006			
January	14	Summer VHF Field Day	
	14	Last day of Ross Hull VHF Contest	
March	18/19	John Moyle Field Day (CW/SSB/FM)	
April	22	Harry Angel Sprint (CW/SSB)	
May	20	VK/trans-Tasman 80 metres SSB	
June	3	VK/trans-Tasman 80 metres CW	
	10/11	ANARTS RTTY Contest	
July	8	VK/trans-Tasman 160 metres SSB	
	22	VK/trans-Tasman 160 metres CW	
August	5	QRP Day	
	12/13	Remembrance Day Contest	
October	7/8	Oceania DX Contest SSB	
	14/15	Oceania DX Contest CW	
November	18	Spring VHF Field Day	
December	26	Ross Hull Memorial VHF Contest	

Results: 25TH ALARA Contest

27/28th August, 2005

Rosanne VK7NAW	528	Top overall, Top novice, Top phone, Top VK7 member
Marilyn VK3DMS	380	CHECK LOG
Chris VK2LCD	294	Top VK OM
Pat VK3OZ	291	Top VK3 member
Celia ZL1ALK	263	Top DX member, Top ZL member
Gerald VK2HBG	249	
Susan VK7LUV	235	
Dot VK2DB	231	Top VK2 member
Margaret VK4AOE	204	Top VK4 member
Christine VK5CTY	195	Top VK5 member
Shirley VK5JSH	164	
Mike VK3AVV	164	
Jenny VK5ANW	160	
Gwen VK3DYL	154	
Kathy VK3XBA	142	
Alan VK8AV	135	
Bron VK3DYF	121	
Peter VK2ZPT	114	
Robyn VK3WXX	103	
Barry VK5BQ	80	
Alan VK7JAB	80	
Ian VK3JS	70	
Colwyn VK5UE	70	
Mavis VK3KS	68	Top VK YL CW
Rosa VK2HOP	57	Top YL non-member
Steve VK5AJM	40	
Elizabeth VE7YL	35	Top VE member
Muriel VK3KNM/2ndop.	32	
Lesley VK5HLS	24	
Lyn VK4SWE	24	
Ray VK3HSR	20	
Rod VK2DAY	15	

SUMMARY:	ALARA members	19 (DX members 2)
	YL non-members	1
	OMs	12
TOTAL LOGS		32

This year was a wonderful success – the conditions were much more favourable, and the inclusion of the triple points to celebrate ALARA's 30th anniversary proved very popular. It was a pity that there were not more of the 'oldies' on air, but for those who were it was great fun.

Some of the comments received: "It must be the most leisurely contest on the calendar"..."Thanks for a great friendly contest"..."It was indeed a pleasure participating in the contest"..."and all these comments came from OMs!

Its great to know that our efforts are appreciated by so many, and yes we do set out to make it as friendly as we can.

However there was at least one log which plainly showed that very little notice was taken of the 'oldies' telling of their bonus points as the scoring was all over the place. However the score was adjusted so that it read correctly! Some Contest Managers are kindly!

Rosanne VK7NAW must be congratulated for a great score on her very first contest.

Chris VK2LCD, our winning OM, certainly had a much better contest this year, and it is a pleasure to note his top score.

I would like to especially congratulate Rosa VK2HOP, who

9 Band DXCC Presentation

21 October 2005

Michael Owen VK3KI

This has been a momentous week in amateur radio, with the coming into force of the statutory instrument, the ACMA Determination that created the Foundation Licence and effectively bundled up our existing licences into the Standard and Advanced licences.

One of the great things of amateur radio is that it encompasses so many quite different aspects. One of those areas of special interest are the various awards, and the WIA is very lucky that our Awards Program is run by someone who is totally committed and very determined, and who has used the need to change the awards to reflect the new national WIA by not just removing the word Federal, but creating a whole range of new and exciting awards. That is, of course, our WIA Awards Manager, Mal Johnson, VK6LC.

Tonight I have the privilege of making a presentation on behalf of our WIA Awards program, presenting David McAulay, VK3EW with the very first WIA 9 Band DXCC Award, certificate number 1, which he achieved last May.

And, just saying that, compels me to say to David that I do hope that you don't think that this presentation has been unreasonably delayed, but I have been away for some 6 weeks, and it was necessary to find a suitable time and place to make this important presentation.

A 9 band DXCC is no small achievement. 100 stations in 100 countries 9 times over are, as the certificate says, 900 countries! To achieve that involves rare perseverance, equipment that really works, and special skills.

Mal tells me that David would be our youngest top VK DXer all rounder, gaining his first DXCC Certificate in November 2000, his 5 Band DXCC in



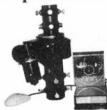
March this year, and only a few months later this award. Mal also acknowledges David's help and contribution to the WIA Awards Program.

Mal has asked that I pass on to you, David, his personal message, which is:

"Congratulations David for your outstanding DXCC achievements. It's been our pleasure processing them for you. Being as you are a "World Class DX operator", and a dedicated person, I hope you find our WIA awards memorable. We trust that this will not be the end and our invitation is for you to continue displaying your personality and special skills."

David, congratulations on this fantastic achievement.

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Results - ALARA Contest continued

was very newly on air, and I think had a wonderful time. By the time she reads this she will be a member of ALARA, and we welcome her.

I think the lack of DX members on air this year may have something to do with the closeness of the contest to the

Alarameet, which was only two weeks later. Many of the girls were busy with travel plans, for which we can forgive them.

There will of necessity, due to the changes in licensing, be some alterations in the rules for the 2006 contest, so make

sure that you check these beforehand. The 2006 contest will be held on August 26/27, so hopefully we will all meet there again along with some of the newcomers to the bands.

33

Marilyn VK3DMS

ar

VHF/UHF - an expanding world

David Smith VK3HZ - vk3hz@wia.org.au
Leigh Rainbird VK2KRR - vk2krr@wia.org.au

Weak signal

David Smith - VK3HZ

With the reshuffling of licensing now complete, it's good to see a number of Standard Class licensees now making the most of their newly authorised

access to the weak signal ends of the VHF/UHF bands.

Chris VK3VSW near Geelong puts out a good signal on 2 m. and is working on

his antenna for 70 cm. Chris has made regular appearances on the morning Aircraft-Enhancement (AE) net, working stations around Canberra and up as far as Leigh VK2KRR near Wagga Wagga.

Rhett has also had a lot of success with the AE net, working many stations in the Canberra region. Rhett has also been quite active on the Wednesday evening 144.150 MHz Net run by his near neighbour Rob VK3EK.

As we move into summer and the band conditions improves, hopefully we'll see many more new and enthusiastic stations on the low ends of the bands.

Spring VHF/UHF Field Day

The Spring VHF/UHF Field Day was held over the weekend of November 11/12. In VK3, the weather was reasonable (one might say "for a change") and there was a good turnout of field stations.

The Geelong ARC (VK3ATL) once again located themselves in the Barrabool Hills west of Geelong and provided big signals on all bands from 6 m to 10 GHz. The SERG / Mt Gambier (VK5SR) set up late on Saturday afternoon, managing to work the GARC on all bands from 6 m to 10 GHz. Rod VK2TWR and friends headed to Kings Cross (no, not THAT Kings Cross) in the Snowy Mountains. Jim VK5OM was back at his old haunt in VK3, north of Nhill. Gavin VK3HY on Mt Terrible was putting good signals into Melbourne, once he'd fixed a dodgy connector. VK3III (Geoff VK3FIQ and others) went out to Corn Hill, south of Ararat. Ken VK3DQW was located north of Geelong somewhere, with a good outlook across the water. Barry VK3BJM headed up to QF13 on Saturday afternoon, intending to enter the 6 hour section, but was having so much fun that he remained there until the end of the contest on Sunday. Ken VK3AKK went out on Sunday morning into QF23 to provide some numbers. VK3HZ even managed to get out to John's Lookout in the Dandenongs to work the GARC on 2.4 GHz and 10 GHz - the first "real" contact (i.e. further than across the backyard) for the 10 GHz setup.



Rhett VK3HAP, north of Bairnsdale, has set up a portable station in his front paddock, operational on both 2 m and 70 cm.



VK2 entrants in the Spring VHF/UHF Field Day. Rod VK2TWR and friends headed to Kings Cross (no, not THAT Kings Cross) in the Snowy Mountains.

Thanks to all who took the effort to go out onto a hilltop (apologies to those I missed), and also to those home stations who came on air to add numbers.

VK/ZL VHF-UHF Propagation Logger

Adam VK4CP has been doing quite a lot of work on the logger software, adding very useful features, including a personalised weather report. With the good propagation season approaching (we hope), I'd advise people to visit the site, enter/update their operator information, and then keep an eye out for any reports of openings. The logger may be found at www.vklogger.com

Associated with the logger is the VHF/UHF Discussion Forum - www.vklogger.com/forum/ If you have a question on a VHF/UHF matter, join the forum and ask away!

Wednesday Evening "150" Net

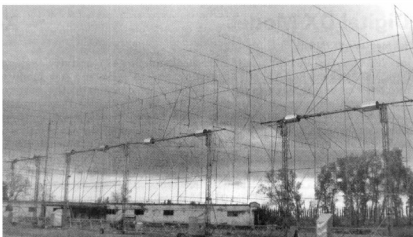
Rob VK3EK reports on recent activity on his 144.150 MHz (plus) Activity Net. On Wednesday 26th October, we welcomed three new Standard Class stations to the Net. It was fantastic to see that some of the new stations that had just got their new privileges to be able to operate on 144 MHz SSB had been building antennas and getting themselves set up. The night was very active on 144.150 MHz with a call in list as follows: John VK3ACA, Craig VK3CMC, David VK3HZ, George VK3HV, Peter VK3NPI, Rhett VK3HAP, Steve VK3NF, Joe VK7JG, Ken VK3DMW, Jim VK3ZYC, Brian VK3NAY, Ian VK3AXH, Ken VK3YDK and Bob VK3AJN.

On 432.150 MHz, the call in list was: David VK3HZ, Jim VK3ZYC, George VK3HV, Rhett VK3HAP, Ken VK3YDK, Steve VK3NF and Peter VK3NPI.

On 1296.150 MHz, the numbers dropped, the only call in was George VK3HV. There were no takers for 2403.150 MHz as conditions on the higher frequencies were unfavourable.

The net is on every Wednesday night at 2030 local time. If you need a reminder, check the VHF Logger as Adam has got it on the Calendar. We are now getting into the warmer weather so will hopefully get some good propagation and also more comfort in those out door shacks.

Till next time on the band, Rob VK3EK
Rob has been running the 150 net for



One of the "big guns" of EME has become even bigger. Sam RN6BN has one of the biggest signals on 2 m, running an array of 32 x 15 element cross-polarised yagis. He recently added extensions on each side of the array, taking it to 64 yagis. That's a stunning total of 1,920 elements. This may well be the world's largest 2 m array - I'm not aware of any bigger. The array not only turns and elevates, but the whole system can be raised and lowered, presumably to help with maintenance. Sam's web site (www.73.ru) has a short video showing the array performing all its moves.

many years, and is nearly to its 400th happening. Perhaps others in other states should think about starting such a net to encourage local activity. I would be happy to publicise it here.

EME

The ARRL EME contest sees a large turnout of stations around the world. This year, it was held over two weekends - October 22/23 and November 12/13.

Doug VK3UM reports on his results for the first weekend. "Saturday polarization was either dispersed or 45 degrees offset from rise to set (quite unusual). Sunday was back to 'normal'. Little to no Libration was seen during both days. Sun noise measured on Saturday approximated 75 sfu. Activity out of NA not good, excellent from Europe (on Saturday). High declination weekends are fine in the Northern Hemisphere, but we hand walkers see the Moon skating along the horizon for longer periods of consequent ground noise. Apogee did not help either but you can't have everything ... it's always a lot of fun.

22/08/2005

N9AB, JA6AHB, JA2JRJ, K5GW, K0RZ, J1LZCG, J1NNJ, K3MF (Did not complete), K1FO, 7M2PDT, OH2PO, OK1CA, DJ6MB, OZ4MM, OZ6OL, SV1BTR, SM3JQU, SP6JLW, UT2EG, FR5DN, UA3PTW, SM2CEW, RW3PX, EA3DXU, I5CTE, G3LQR, S52CW, DL7APV, G3LTF, HB9Q

23/10/2005

KL6M, SM2ILF, SM3AKW, S51ZO, G4RGK, DL9JY, DL0SHF

36 x 24 so far ... there are a huge number of regulars not in the above log!

You can only work those that are present! Thanks also to several 'smaller stations' (1 yagi) that reported hearing me, so conditions could not have been as bad as some believed. Persistence required! A special thanks to DL9JY who stuck around after I changed tubes and got going again after 6 minutes and also to FR5DN, when I also had a time out following an arc over. A new feed will be installed in the dish by next contest period and also (hopefully) a better final bottle will bring me back my current lacking of '3 dB transmit sensitivity'! (if I can find one in time). Can't rely on anything these days ... failing as a 'pull out' after 18 years faithful service!

73, Doug VK3UM

Finally, I hope everyone has a happy and healthy Christmas and New Year. May you be in the shack with the rig turned on and the antenna pointing in the right direction when that big opening to the exotic DX location occurs.

Oh, and Santa, I'd like an antenna just like RN6BN, please. I've been very good this year, really.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Digital DX Modes

Rex Moncur - VK7MO

Ian, VK3AXH; Des, VK3CY; Jim, VK3II; Dave, VK2AWD and Rex, VK7MO have been checking out the new beta version of WSJT and providing feedback to Joe Taylor, K1JT. On FSK441 we have found that the waterfalls do not always provide a reliable manual decode. This is due to a bug that causes the point of decode to vary from the point where the meteor shows on the waterfall. There is also timing problem such that the DT is out by one second, which shows up as a difference of two seconds between two computers. Essentially this means that if both computers are on time they will both show a DT of plus one second. Both of these problems, as well as others discovered elsewhere, should be corrected in the next version, 5.8.7 that should be available as you read this.

Peter, VK5ZPG, at Quorn near Pt Augusta is active, transmitting first period, in the hour before the normal

weekend FSK441 activity session on 144.230 MHz and has made a number of contacts to the Eastern States. He says that he is having lots of fun and has rejuvenated his interest in Amateur Radio. His experience is a good demonstration of how the digital modes can allow operators in remote areas to remain active on 2 metres. On one occasion he detected part of a burn that ran for 42 seconds and took the opportunity to inject some Australian context into meteor scatter nomenclature by coining the name "bushfire" for long burns, which we will define as more than 15 seconds.

Congratulations to Bob, ZL3TY, on extending his own World 2 metre EME Record to 19434 km with a contact to EA2AGZ and to Nick, ZL1IU, who a few days later worked EA5SE and extended the record to 19451 km.

With Nick, ZL1IU, up and running on

the digital modes, he accepted a proposal for a meteor scatter test to Hobart over a distance of 2431 km. This is around the theoretical maximum for meteor scatter and requires the meteor to be very close to the centre of the path and to ionise a little higher than the average. As such it is a real long shot, but not impossible as some recent contacts have been made between Europe and Russia up to a little over 2500 km. In two hours testing only one signal was detected but it was a good short burn of 1.5 seconds with both calls being repeated three times, which at least suggests it is possible. We will try again during the Geminids. With Nick, operational on FSK441, it should be possible to work to the North Island of New Zealand from much of the East Coast of Australia.

Please send any Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

The Magic Band - 6 m DX

Brian Cleland - VK5UBC

Although some have been of short duration several openings occurred during October and on several occasions beacons were heard without contacts being made.

A good opening occurred on the 3rd October over much of the country. From my portable QTH at Corny Point (PF85mc) the band was open to VK1, 2, 4 & 6, the opening to VK6 lasting several hours but with only John VK6JJ & Wayne VK6JR available to contact. On the same day Norm VK3DUT reported hearing the Alice Springs beacon and had an interesting contact with VK2YVG Broken Hill 5x9+ on his 10 W.

On the 12th October Norm worked Roy VK4ZQ, Wayne VK4WS both 5x9 and on the 17th October heard the Gold Coast beacon VK4RGG/b 529. Then on the 18th October he worked VK4's WS, ADM, BIT, ARS, YRP, NW, SJ, BLK and Brian VK5UBC.

On the 22nd October a surprise opening to JA from VK3 when Norm V3DUT heard JA7/b then worked 25 JA stations in the 1, 2, 6, 9 and 0 areas with many signals over S9, not a bad opening for bottom of cycle. Rob VK3EK,

who alerted Norm to the opening also, worked a good number of JAs.

To complete a good month for Norm he also reports hearing the FK8 beacon on the 29th October and ZL TV on the 30th.

A lot of activity occurred on the 17th and 18th October with Neville VK2YO from Northern NSW working VK5UBC and VK7ZIF. Brian VK5UBC also reports working John VK2HO and Brisbane stations on these days. Wayne VK4WS worked several JA stations on the 17th with Trevor VK4AFL heard working JA1RGU using 30 W and a dipole with 5/9 reports.

The Alice Springs beacon was also heard in Adelaide on the 17th & 20th October.

On the 22nd October Ray VK4BLK from Yeppoon worked several VK3's as well as VK5UBC.

Another big JA opening from the Brisbane area on the 5th November with Wayne VK4WS working many JA's on both CW & SSB. On the same day the band opened from VK2 (Sydney area) to VK5.

The Barossa Club is in the process of establishing a new 6 m beacon from the Barossa Valley area. It will be located at the same location as the Barossa 2 m & 70 cm repeaters, Mt Kitchener in the Barossa Valley, which is 580 m above sea level and 80 km north of Adelaide. The beacon will be running CW with the callsign VK5RBV on the frequency of 50.315 MHz. It will be running approx. 20 W and using a Halo antenna. At the time of writing it is in test mode and should be fully operational by December. The club would welcome any reports to vk5brc@gmail.com.

By the time the December magazine is printed the 6 m summer DX season should be in full swing. Historically the bottom of the sunspot cycle produces good sporadic 'E' seasons. I'd like to thank all those who have forwarded me information for the column throughout the year and wish everyone a Merry Xmas and Happy New Year.

Please remember to send any 6 m information to Brian VK5UBC at bccland@picknowl.com.au.

2 m and 70 cm FM DX

Leigh Rainbird - VK2KRR

Welcome to the October report. Conditions down south were poor for most of the month except for the first few days. But, tropospheric conditions in Queensland were, as they say, on the boil, with a few international tropo contacts thrown in to boot.

On the 01/10, conditions in the morning began very well down the VK4 coast. Many good contacts were available for those in the know. Some of the better contacts were; from Mike VK4MIK near Cairns, who worked to VK4RGA Monto repeater at 951 km, VK4RBU Bundaberg repeater at 1000+ km, VK4RGY Gympie at 1227 km, VK4RHY at Hervey Bay and VK4RGT at Gladstone. Mike also worked simplex with Noel VK4VJ, Wayne VK4ZRT and Mike VK4JOJ all at Gladstone. Mike VK4JOJ is 1160 km distant from VK4MIK and was VK4MIK's first simplex contact over 1000 km.

Along with Mike, Felix VK4FUQ was also working a number of DX repeaters such as Mackay, Hayman Island and Monto from Felix's QTH at Ingham.

On 03/10, conditions were again good in VK4. VK4MIK worked down the coast about 550 km distance to around Mackay. Mike also made simplex contacts on 146.500 MHz with Wal VK4AIV and Rick VK4AIM. Mike also worked to the Townsville 70 cm repeater a number of times.

Mike also reports that Gary VK4ABW at Townsville was able to work across to the FK8ZHA 146.800 MHz repeater on Mt Doo at New Caledonia. Garry worked FK8AH and FK8GX. This is a good 2000 km for Gary.

On 04/10, down in the south east corner some good contacts were had. From my QTH I could access most of the VK5 repeaters, which included Port Lincoln on 146.750 MHz, which was a 5/9 signal at 1019 km. Murray Bridge and Lobethal were 5/9+40. VK5UBC at Corny Point was able to get to some VK3 repeaters and I worked Brian on 146.500 MHz for a nice 914 km contact, though the signal was only 5/3.

On 05/10, Mike VK4JOJ at Gladstone was able to access the FK8ZHA repeater at New Caledonia - a distance of around 1560 km for Mike. Disappointingly for Mike, at that stage there were no operators about to answer his calls.

Also on this date, some very good

tropo occurred from inland southern NSW up to the north toward Brisbane. Alan VK2KAW in Wagga mentions being able to work up to 24 repeaters in his north. One good example is the Tamworth repeater on 146.750 MHz. Meanwhile John VK2YW mobile in Wagga was able to access many repeaters such as 146.900 MHz from Condobolin and 146.775 MHz from Young.

On 06/10, some fairly selective conditions from my QTH at The Rock. I had Renmark TV on 143.760 MHz running full scale at 600 km. Also had access to Port Pirie at 867 km and Port Augusta at 913 km.

On this date Felix VK4FUQ also reports being able to weakly hear the New Caledonian repeater on 146.800 MHz FK8ZHA.

On 07/10, a break through for Mike VK4JOJ, who this morning made it back into the FK8ZHA repeater and finally found some stations to make contact with. These were FK8AH and FK8GX. Mike's signal from the repeater was 5/9+40. Mike then worked FK8GX on simplex and reports a 5/4 signal.

On 08/10, Burnie VK4KAC, who I think is in the Brisbane area, reports that he was able to get to repeaters at Bundaberg, Glen Innes, Coffs Harbour and Lismore. Burnie also got way out to New Caledonia but reports no one was awake.

Today, Felix VK4FUQ was able to hear the Gympie repeater on 146.625 MHz, but was very frustrated when he was unable to break into the stations talking on the repeater due to lack of time left between others.

Felix also made it to the Mackay repeater where he worked with Rick VK4AIM in Mackay and John VK4FNQ from Charters Towers. Felix was able to work Rick on simplex to top the day off.

Between the 18th and the 22nd of October, Tony VK3TLA was maritime mobile in the Bass Strait with some 2 m & 70 cm equipment. Tony mentions that while in transit from Westernport to Deal Island, he was able to work some VK7s on 2 & 70 FM. The best contact was from a station at Penguin (VK7BBW?) using the VK7RWC repeater, this was around 320 km and others on the east coast were in the order of around 250 km.

Finally on the 25/10, Russ VK4BEG near Cairns was able to work to the Townsville repeaters on both 2 & 70. The 2 m repeater was peaking 5/9+40. Russ worked John VK4FNQ on the Townsville 70 cm repeater and the on 70 cm simplex.

Hope you all have a Merry Christmas and New Year and are able to catch some good DX over the summer season. Good luck.

Please remember to send through any 2 & 70 FM DX reports to Leigh VK2KRR at vk2krr@wia.org.au

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Ross Hull Memorial VHF Contest Starts Boxing Day

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The VK5BR-X antennas

Some modified ideas on how they work and how they perform

Lloyd Butler VK5BR

(Further experimentation has revealed more about the causes of rise in antenna resistance. Also we see that more radiation can be achieved by unbalancing the antenna circuit.)

Earlier estimates of radiation efficiency in the X2/X3 antennas were based on measuring the difference between total antenna resistance and series coil loss resistance. The difference was thought to be radiation resistance resulting from the crossed E and H fields. It is now clear that this difference is due to other factors and the antennas are now not considered to be operating in a crossed field mode.

Further experimentation has also shown that, rather than be enhanced by crossed fields, the radiation can be increased by connecting the antenna circuit so that it is out of balance. This causes a common mode current component in the feeder, particularly high at the antenna end, so that the antenna itself forms an efficient top loading element for the common mode current as a radiator.

Forward

The original concept of the X antennas was based on the controversial crossed field theory. The open magnetic fields from coils in series with the short dipole legs are arranged so that they interact with the electric field between the two dipole legs. It was considered that at least part of these fields would be at right angles to the electric field and, because the current through the coils must be in phase with the voltage across

the antenna resistive load, the magnetic field from the coils must also be in phase with the electric field across the dipole. This made up much of the requirement for crossed field antenna operation. For more detail, refer to the article on the X antennas in *Amateur Radio*, July 2004.

The simplest form of the X antenna is the X2 connection shown in Figure 1. Here we have a balanced dipole antenna, about 2% of a wavelength, loaded with two series coils and fed via a balanced but tuneable line controlled by a Z Match Antenna Tuner.

The antenna dipole capacitance is very low and somewhat less than 10 pF for the higher frequency HF antennas to a little more the 10 pF for the 80 metre antenna (so we see reactances of over 1000 ohms at 14 MHz and 3000 ohms at 3.5 MHz). The total inductive reactance of the two coils in series is selected close to the capacitive reactance of the dipole capacitive reactance at a frequency within the band of operation. Precise equality between the two reactances is not imperative as resonance at the frequency of operation is made with corrective reactance (where necessary) reflected up the balanced line by adjustment of the Z Match.

The total load resistance of this antenna was assumed to be the sum of the loss resistance in the coils and the load resistance presented by the antenna, resulting from electromagnetic radiation and induction into nearby objects. Measurement of coil loss resistance and total resistance of the antenna series circuit is shown in Figure 2.

Based on formulae to calculate radiation resistance, a dipole of about 2% of a wavelength would have a radiation resistance of around 0.1 to 0.2 ohm. So, in measuring total resistance of the antenna, a resistance close to that of the coil loss resistance would be seen.

Coil loss resistance varies between around 4 ohms for 10 metres to 10

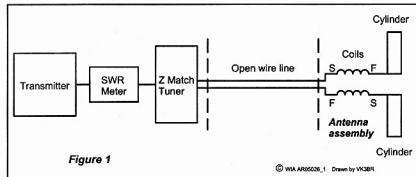


Figure 1

© WIA AR05026_1 Drawn by VK5BR

Figure 1 - Tuning arrangement VK5BR X2 antenna.

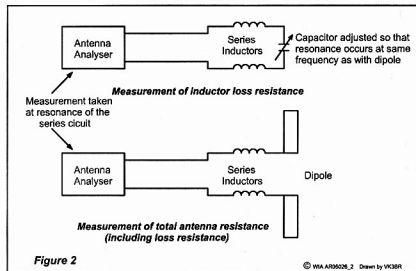


Figure 2

© WIA AR05026_2 Drawn by VK5BR

Figure 2 - Measurement of coil loss resistance and total antenna resistance.

ohms for 80 metres. However, in making measurements, total resistance considerably higher than the loss resistance has been recorded in the region of 15 to 40 ohms. Some of this can be shown to be induction into objects or earth which are too close to the antenna. But the remainder has been taken as radiation resistance very much higher than that of the calculated figure for the basic dipole and assumed to be due to the interacting E and H fields.

A questionable aspect of this explanation is that the antenna still seemed to work when the coils were rotated by 90 degrees away from their maximum line of field. This was discussed in my article in *Amateur Radio*, April 2005 and explained away by virtue of the fact that a field around an open coil spreads at all angles.

It was suggested to me that the theory of interaction could be tested by substituting the open coils with two coils of equal inductance but wound on toroidal iron dust cores. This would confine their magnetic fields essentially to the toroidal core and limit most of the interacting magnetic field.

So I wound two coils (Figure 3), 6.5 μH (23 turns) on 50 mm T200 iron dust cores and tried them on both of the 20 metre X3 antennas I had, but used the X2 connection because I needed to take resistance measurement. The series loss resistance measured at resonance, with a fixed capacitor substituted for the antenna capacitance, proved to be 1 or 2 ohms less than the open coils.

Assuming that all the magnetic field from the toroidal coils was confined, the resistance reading with the antenna dipole connected should have been almost the same as the previous coil loss resistance reading. Not so! In fact, the total resistance with the toroidal coils was considerably higher than with the open coils. This resistance on one antenna, resonating at 14.8 MHz, was as high as 24 ohms, nearly three times the loss resistance. It almost suggested that the circuit with the highest unloaded Q gives the highest radiation resistance.

Further to this, when powered the antenna seemed to be operating and radiating at least as well (if not better) when using the toroidal coils.

All this leads to assumption that my original theory for the X2/X3 antennas operating in a crossed field or field interacting mode was wrong. There had to be some other explanation why the

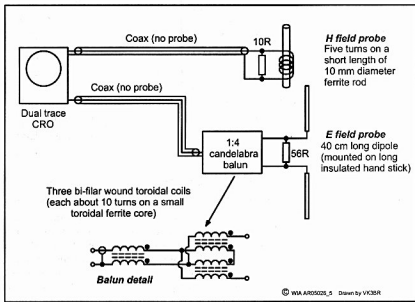


Figure 3 - Toroidal coil.

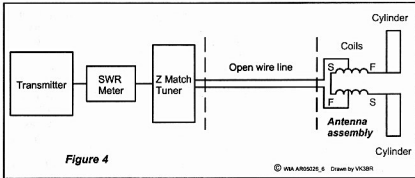


Figure 4

Figure 4 - 40 metre antenna assembly with centre of separating plates cut out.

apparent radiation resistance is raised well above that of around 0.1 or 0.2 ohms derived from common formula for the 2% wavelength dipole.

Dielectric Loss Induction Loss.

My previous test procedure has been to assume that losses in the antenna circuit were essentially due to losses in the series coils. However, as discussed above, the high Q creates a very high impedance across the capacitance of the antenna. Quoting the example of a series resistance of 20 ohms and a $Q = 50$, the shunt resistance across the capacitance at resonance is $20 \times 50 \text{ squared} = 50,000 \text{ ohms}$. Such resistance could, in part, be due to excessive dielectric loss resistance in the insulating plates separating the dipole elements.

It seemed strange to me that the series

resistance measurement on the 10 metre antenna was so much lower than the 20 metre antenna. The only difference was that the insulating plates for the 10 metre antenna were made of plexiglass (which appears to be a form of polystyrene) whereas those for the 20 metre antenna were made of hardboard. So I re-made the separating plates for the 20 metre antenna in plexiglass and this lowered the series resistance by about 8 ohms to a value nearer to the loss resistance determined for the coils.

I then operated on the 40 and 80 metre antennas. In these I cut the centres out of the hardboard separating plates so that a skeleton plate was left sufficient to fix the dipole elements apart and provide mounting for the coils (see Figure 4). This lowered the series resistance of the 40 metre antenna by 6 ohms and the 80 metre antenna by 5 ohms.

The resistances of these two antennas

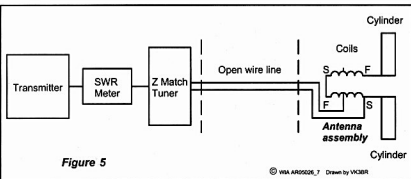


Figure 5

© VWA AR2626_7 Drawn by VCBOR

Figure 5 - Measurement of phase between E and H fields on X2/3 40 metre antenna.

were still considerably higher than the coil resistances, but at these lower frequencies it appears that considerable coupling takes place to surrounding objects and particularly earth. In particular, the resistance of the 80 metre antenna rises considerably as its height above the ground is increased, increasing to values as high as 44 ohms.

I thought to check out other available insulating materials, so I also tested the 20 metre antenna with plates made from PVC sheet and the 10 metre antenna with plates of polyethylene sheet. These gave similar results to the plexiglass. It was only my hardboard which clearly showed the high dielectric loss.

These latest tests have shown that this added resistance is more to do with dielectric loss between the dipole plates and induction loss than the result of crossing or interacting of the E and H fields as previously assumed.

The induction loss into earth and other objects is particularly apparent for the lower frequency antennas. It may be pure absorption loss but it could also be induction into other structures which re-radiate. This latter idea seems to have real significance if the field spreads around another antenna wire which happens to be resonant near the frequency of the local field or is harmonically related.

E-H phase Testing

The design of the X2/X3 antennas was originally based on the in-phase relationship between H field generated by current through the coils and the E field generated across the dipole plates. I checked this relationship with probes connected to a dual trace CRO. This was a bit tricky as the CRO leads pick up stray longitudinal voltage and give false indication of what is being read.

Figure 5 shows the arrangement I eventually used to carry out these tests on the 40 metre X2 and X3. As shown on the diagram, I cast aside the usual high impedance probes and used direct connection to the CRO inputs across a very low terminal resistance which discourages stray signal pick-up.

The H probe, placed near the end of either coil, had a few turns around a ferrite rod and terminated in a very low resistance (10 ohms) so that the voltage fed to the CRO depicts the current induced from the magnetic field.

The E probe was a short dipole which was terminated in as low a resistance as possible, but sufficient to get a reading on the CRO when the antenna was fed from the highest level available from my 'sig-gen'. By using this and isolating with my candelabrum balun to reject longitudinal pick-up, I was able to get sufficient pick-up of the antenna electric field by holding the dipole a few inches away from the centre of the antenna.

The tests were carried out for both the X2 and X3 connections and sourced with a signal generator fed direct to the antenna input as well as using the transmitter output fed via the Z Match and a short length of open wire balanced line. The tests confirmed the in-phase relationship required.

Interim conclusions

Referring to previous articles, I had assumed that the considerable rise in series antenna resistance was due to the crossed field condition set up by interaction between the E and H fields. However, the more recent tests show that is not the case and the antenna radiation is not being enhanced to a significant degree by the interacting fields. I have to assume one of the following:

- (1) The fields are not correctly oriented

or not in phase and my testing procedure to monitor this was inadequate in verifying this.

or

- (2) The fields are oriented suitably for the crossed field condition but they do not produce the degree of radiation enhancement which has been promulgated as characteristic of a crossed field antenna.

Either way, I cannot continue to classify the antenna as working in a crossed field mode.

Actual radiation resistance is much lower than previously assumed and hard to quantify as a means to derive radiation efficiency. Claudio Re IIRFQ tried a different method. He carried out some field measurements on a 10 metre X3 antenna in comparison to a ground plane reference antenna. He derived figures of 10 dB down and an efficiency of the X3 as 10 %. In amateur radio terms this is about 1.5 S points down and seems to agree with some test reports I have received at 1 to 2 S points down on a full size antenna. Of course this was the original balanced X3 antenna and we are going to look further at what happens when it is put off balance.

The X3 antenna unbalanced

The original balanced 40 metre X3 antenna system is shown in Figure 4. The antenna is driven in its balanced form via open wire tuned line and a Z Match Tuner. In this arrangement, the antenna has been given signal reports around two S points below the level of a reference end fed half wave inverted V antenna with its apex about 10 metres above the ground. Received levels are also several S points below that from the inverted V. Considering that I now believe there is no enhancement from crossing E and H fields, these figures seem consistent with those which could be predicted from a simple dipole.

Much of the information gathered for the EH antenna seems to point to best performance when the antenna has a degree of unbalance to generate a longitudinal (or common mode) current in the antenna system. In both the L+T and Star EH antennas one dipole leg is directly connected to the braid side of the transmission line. For the L+L EH antenna it was necessary to wind one inductor with less turns than the other. The Star antenna in balanced form didn't perform so well.

On this theme, some tests have been carried out to see what happens when the X3 antenna circuit is deliberately unbalanced making it look more like the type of circuit used in the Star EH antenna which has one dipole element directly connected to one leg of its transmission line. I tried several connections using the coils as they exist with their fixed taps. The connection arrangement shown in Figure 5 seemed to produce the best field strength result. I will give reference to this antenna arrangement as the X3U.

Using this X3U arrangement there was still field measurable around the dipoles but much less than for the balanced connection of Figure 4. However, using an H field detector with LED display, I was able to track consistent magnetic field right down the length of the transmission line from the antenna to the Z Match output. This was clearly caused by unbalance of current between the two legs of the line.

The X3U antenna was hung about 2m above the ground with the feedline on average about 1.5m above the ground. There was 7 metres of feeder in open space plus 4 metres entry under the carport and shielded by its steel roof. On test, the received level now appeared slightly higher than the Inverted V antenna. On transmitting, I received several signal reports from stations on the east coast of Australia. These reports indicated similar signal levels being transmitted from either antenna. Further reports on another day from a network of stations put the X3 at a higher level than the Inverted V.

I concluded that by putting the short balanced dipole out of balance, the field strength is increased from that inherent to the short dipole to something close to that of a full sized half wave antenna.

I think the tuned dipole takes over as prime radiator to providing a differential termination for the transmission line. But because of the unbalance, a longitudinal (or common mode) current component also runs on whatever length of line is now left without a balancing or common mode rejecting interface. This current tends to be quite high at the antenna end of the antenna system compared to a base loaded antenna system which has very low current at its apex. It may be that the dipole, resonated with its inductors, forms a sort of top loading function to the common mode current component.

In May 2004 *Amateur Radio* I discussed

how the unbalance leads to unequal dipole leg currents via capacitance to earth. Voltage at the dipoles is multiplied by the very high Q of the shortened antenna circuit; this leads to multiplication of those currents.

I figured that more measurement might reveal how the longitudinal current component might vary over the length of the line. It did seem to me that if the antenna coupling was set such that the dipole circuit loads the transmission line with resistance equal to the line characteristic impedance, current in the line (even if unbalanced) would possibly be fairly constant over its length.

I was able to monitor more carefully the relative strength of common mode current right down the line to the X3U by sliding a large ferrite toroidal core over both wires of the pair and coupling the core to a milli-ammeter with detector. The tests showed maximum common mode current at around one quarter wavelength down from the antenna and at about three times the current near the antenna input and the Z Match Tuner output. However, the current maximum could be shifted to the antenna entry point by shifting the location of the Z Match tuner so that the open wire line section was seven metres long and less than ¼ wave. In this case, the current was near constant to a about four metres down the cable, and falling to a low value at the output of the tuner. Despite this, the former test connection, with the longer line, produced higher signal level reports on air test..

I repeated the experiment for the 20 metre and 80 metre X3 antennas using the out of balance connection. Even better for these antennas, the common mode maximum was at the topmost end of the open line where I figured it could be most effective. For the 80 metre test, the common mode current was almost constant over the 13 metre length of line.

One objection raised for allowing the feeder line to be part of the antenna system in the EH antenna was the interaction between antenna tuning and the length or position of the feeder. The same applies to the unbalanced X3 but tuning correction is easily made in the radio shack using the Z Match Tuner.

Some conclusions

The original design of the X2/X3 antennas was based on the controversial

cross field theory. Earlier measurements of high antenna circuit series resistance led me to believe that the antenna was working in this mode. However, more recent investigation has shown that as far as the balanced form of the antenna is concerned, the high value of resistance is due to other factors, not radiation resistance resulting from the crossed fields. I now assume that radiation from the antenna, in its balanced form, is simply that which can be predicted as normal in any dipole.

However, I have shown that by unbalancing the form of the dipole (as for the X3U connection) so that the feedline is activated with common mode (or out of balance) current, the radiation level can be raised to nearer that of a full sized resonant dipole.

So it seems that first setting out to make a balanced small dipole which was supposed to demonstrate how interacting or crossing its electric and magnetic fields could enhance its radiation, we have discovered that it doesn't. But, instead, if we put the antenna circuit off balance, we have a magnificent top loading device for a radiator formed from the feedline out of balance current. That is what experiments with amateur radio are all about.

A short note on EH antennas. Having written quite a bit about these and their operation in a crossed field mode, I now have similar doubts about whether this mode is the radiation enhancing factor. From what we have learned about the EH antenna, it's antenna circuit is clearly unbalanced and it does seem to need at least a short feeder tail for best operation. I suspect that the same sort of process takes place as I have described for the unbalanced X3.

References

1. Refer to articles on the VK5BR X antenna in previous issues of *Amateur Radio*, November 2004, March and April 2005.
2. Refer to articles on the EH Antenna by VK5BR in previous issues of *Amateur Radio*, April and November 2003, and May, July and September, 2004.
3. Refer to articles on the X3 and the EH Antennas by VK5BR at <http://www4.tpgi.com.au/users/ldbutler/>

Or link from: <http://www.qsl.net/vk5br/>

Adelaide-Accra

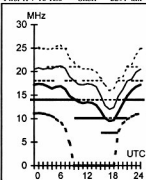
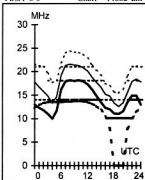
242

Brisbane-Auckland

123

First F 0-5 Short 14682 km

First IF7-10 IE0 Short 2291 km



December 2005

T index: 19

Legend

Frequency scale

UD
F-MUF
OWF
E-MUF
ALF
>10%
>50%
>90%

Time
Scale

HF Predictions

by Evan Jarman VK3AM

34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.

These frequencies are identified in the legend are:-

- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable.

The path, propagation mode and Australian terminal bearing are also given for each circuit.

These predictions were made with the ionospheric Prediction Service program: ASAPS Version 4

Adelaide-Moscow

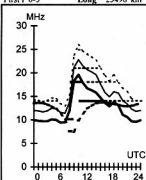
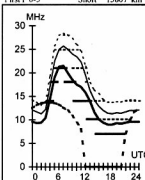
318

Brisbane-London

147

First F 0-5 Short 13807 km

First F 0-5 Long 23498 km



Canberra-Capetown

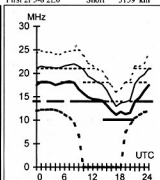
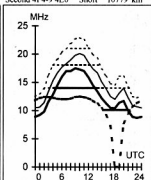
219

Darwin-Invercargill

144

Second 4F4-9 4E0 Short 10779 km

First 2F5-8 2E0 Short 5159 km



Adelaide-Ottawa

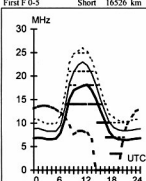
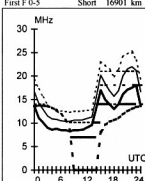
58

Brisbane-London

327

First F 0-5 Short 16901 km

First F 0-5 Short 16526 km



Canberra-Los Angeles

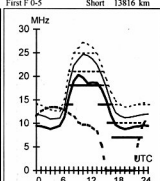
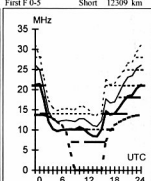
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Darwin-Paris

322

First F 0-5 Short 12309 km

First F 0-5 Short 13816 km



Adelaide-Vancouver

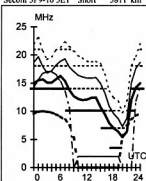
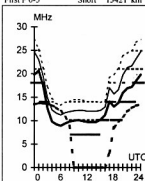
59

Brisbane-Manila

320

First F 0-5 Short 13421 km

Second 3F9-16 3E1 Short 5811 km



Canberra-Wellington

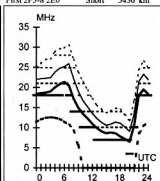
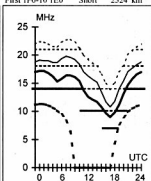
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Darwin-Tokyo

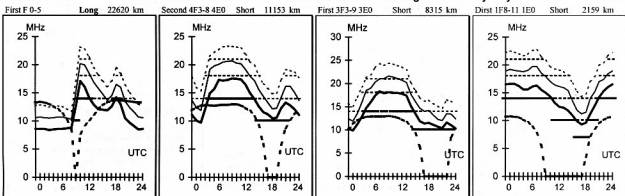
10

First IF6-10 IE0 Short 2324 km

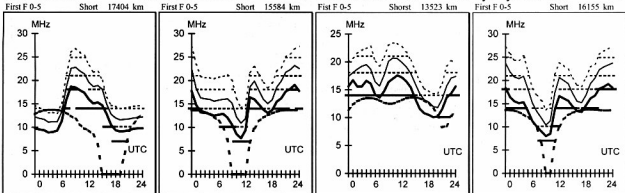
First 2F3-8 2E0 Short 5436 km



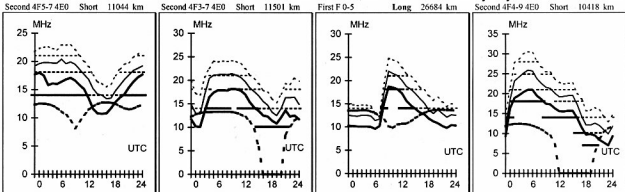
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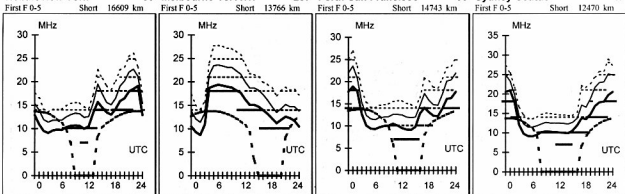
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VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9895 9261 advisory@viawic.org.au	VK1WIA Sunday 11.0am via HF and major VHF / UHF rpters
VK4 Queensland VK4ERM Ewan McLeod VK4ZZ Gavin Reibelt	Phone 07 3221 9377 ewan.mcleod@bigpond.com	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rpters
VK5 South Australia and Northern Territory VK5NB Jim McLachlan VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 jimmac@picknowl.com.au peter.reichelt@bigpond.com vk5atq@chariot.net.au	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide, (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ advisory@vk6.net vk6ne@upunaway.com vk6xv@bigpond.net.au	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz. Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury), 147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900, 147.000, 147.200, 147.250 and 147.350 MHz..Also in "Real Audio" format from the VK6 WIA website
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 3.570MHz LSB, 146.700 MHz FM (VK7RHT South), 53.825MHz FM (VK7RAD South), 147.000MHz FM (VK7RAA North), 146.750 FM & 53.825MHz (VK7RNW North West), 146.625 MHz FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27MHz CB - 27.225MHz LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090MHz LSB & 14.130MHz USB

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

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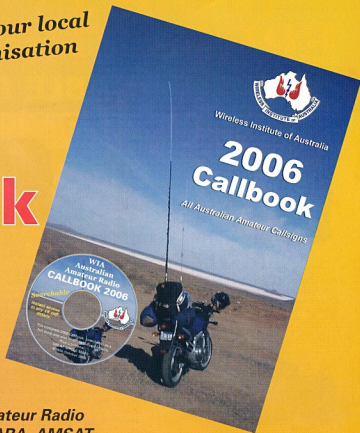
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